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Examining the Relationship Between Puppy Raisers and Guide Dogs in Training

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Examining the Relationship Between Puppy Raisers and Guide Dogs in Training

by

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Dedication

To Brandy and Quasia, who were the first dogs to teach me about the importance of understanding more about their kind. Thank you for showing me just how uniquely different, but still wonderful human-dog relationships can be.

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Examining the Relationship Between Puppy Raisers and Guide Dogs in Training

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Supervisor: Samuel D. Gosling

Dogs play a unique role in the lives of humans. Many people form positive relationships with dogs but some do not. In working dogs, the relationship that dogs form with humans is particularly important due to the trust people need to put in their dogs. The aim of this dissertation was examine the relationship between guide dogs in training and the puppy raisers who care for the dogs during the dog's early life. I developed a questionnaire designed to tap the most important elements of the relationships between puppy raisers and working dogs. Participants filled out the questionnaire when their dogs were approximately 4-months of age (131 participants), 8-months of age (124 participants), and 13-months of age (140 participants). Principal component analyses suggested that the puppy raiser-dog relationship can be divided into five different factors: Anthropomorphism, Obedience, Closeness, Understanding of dog, and Care of dog. I evaluated the degree to which measurements using this instrument generalized across testing occasions (separated by four or five months) and rater perspectives (self vs. other). Most relationship factors (except Closeness) generalized across testing occasions and there was mixed evidence for generalizability across rater perspective. Next, I assessed the criterion validity of the questionnaire with respect to two other measures of relationship skills. One criterion measures was furnished by experts observing the dog

and puppy raiser interact in a formal evaluation. The second criterion measure was derived from codings and ratings of videotapes from a portion of the evaluation. The puppy raiser-dog relationship factors of Obedience and Understanding of dog predicted scores on both criterion measures. Finally, I assessed the degree to which characteristics of both the human and the dog predicted the relationship factors. Human characteristics (in particular personality and participant age) influenced most of the relationship factors. Dog characteristics (in particular trainability and attachment) influenced some of the relationship factors (especially Obedience and Understanding of dog). These results can help us to better understand when relationships might succeed and when might fail. Such information can help in many applied contexts where humans and dogs form a relationship.

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CHAPTER 1: INTRODUCTION

The exact point at which humans started interacting with dogs is not known, but the relationship goes back for thousands of years (Serpell, 1995). Early human-dog interactions probably looked vastly different than they do today, with early humans mainly being motivated to interact with dogs to benefit their own primary needs (Serpell, 1995). Today people interact with dogs for a much wider variety of reasons, ranging from companionship to working-dog roles (Serpell, 1995).

The human-dog relationship is unique as far as relationships between two species go. Some people treat their dogs similarly to how they treat their children (Hirschman, 1994). Some dogs go to extraordinary measures to protect or rescue their owners (Collins, 2014). Yet, other people fail to form any type of connection or relationship with their dogs and some dogs fail to form any connection or relationship with their owners (Marston & Bennett, 2003). Understanding more about human-dog relationships is important because dogs play a huge role in humans' lives today.

What is the Human-Dog Relationship?

Few studies have examined what it means when we talk about the human-dog relationship. So, examining relationships in general may offer some insight into understanding the human-dog relationship.

A relationship, in general, is a series of interactions in time (Hinde, 1976). When describing relationships, it is important to consider things such as the content, quality, and patterning of those interactions (Hinde, 1976). Each relationship a person may have

differs depending on the type of relationship it is and the person involved in that relationship. For example, a person's relationship with his or her peer is going to be different from a person's relationship with his or her parent. The differences come from the different ways in which different types of relationships are organized. A peer-peer relationship is not obligatory and there does not tend to be dominance by one participant over the other, whereas a parent-child relationship is organized by power and stability (Laursen & Bukowski, 1997). Other relationships are organized in other ways as well, with sibling relationships likely involving some sort of dominance by an older sibling, but a lot less so than a parent-child relationship.

Drawing from the broad description of what relationships consist of, human-dog relationships can be thought of as a series of interactions in time between humans and dogs with the content, quality, and patterning of those interactions being essential to understanding the relationship. A person's relationship with his or her dog is likely to be organized in a different way than his or her relationship with other people. Understanding more about the human-dog relationship can give us better insight into how to create healthy and positive relationships with dogs.

Some research has begun to specifically examine the human-dog relationship. One of the early ways researchers defined human-dog relationships was by regarding the relationship as a substitute for other human relationships (Gavriele-Gold, 2011). These ideas go back to Freud, who loved dogs and even took his Chow, Yo-Fie, to all of his therapy sessions for seven years (Gavriele-Gold, 2011). Freud did not write much about his views on the human-dog relationship, but his followers interpreted his work to describe human-dog relationships as a neurotic way for people to displace their love onto

an animal (Gavrielle-Gold, 2011). For years, the human-dog relationship was regarded as just a substitute for other human relationships.

More recently researchers have begun trying to understand the human-dog relationship by examining the aspects that define the relationship. Much of the research examining the human-dog relationship focuses on attachment, which was examined in humans by exploring the relationship that forms between children and parents (Bowlby, 1973, 1980, 1992). Studies of attachment between humans and dogs have examined the attachment between children and their pets (Melson, Peet, & Sparks, 1991), attachment differences between handled and non-handled shelter dogs (Gácsi, Topál, Miklósi, Dóka, & Csányi, 2001), and attachment in dogs with separation anxiety (Parthasarathy & Crowell-Davis, 2006). Fewer studies have examined other aspects of the human-dog relationship. Examining aspects such as what humans and dogs do with one another and how much time they spend with one another are likely to be informative about the relationship but are often neglected when focusing on the attachment between humans and dogs.

Other considerations when examining the human-dog relationship involve whether the relationship is examined from the human's perspective or the dog's perspective. Some studies examine the relationship from the human's perspective, such as how attached the human feels towards the dog. For example, Kurdek (2008) examined the level of attachment college students had to their pet dogs. Other studies examine the relationship from the dog's perspective, such as how attached the dog is towards the human. For example, to understand dogs' attachment to their owners, Topál, Miklósi, Csányi, and Dóka (1998) examined how dogs reacted when their owners left them in a

room with a stranger. To fully investigate the human-dog relationship, it is important to take both the human and the dog into consideration, especially in light of recent research, which has found the strength of the relationship an owner feels with his/her dog does not match the strength of the relationship a dog feels with his/her owner (Rehn, Lindholm, Keeling, & Forkman, 2013).

Importance of Human-Dog Relationships in Working-Dog Programs

The relationship that forms between working dogs and their caretakers is especially important. In today's society many different working roles for dogs have been created from guiding people with visual impairments to detecting explosive devices in Afghanistan. In each of these working roles, the dog's caretaker has to be able to trust the dog will do his or her job effectively and in order to do so, it is likely that a positive relationship has to be established between the dog and caretaker.

Research has shown the first year of a dog's life involves biological and physiological critical periods in which many behavioral characteristics have been shown to be highly responsive to social conditions (Scott & Fuller, 1965). Many working-dog organizations recruit volunteer 'puppy raisers' with a wide range of dog experience to care for the dogs in their programs during the dog's first year of life. The different ways in which these puppy raisers socialize and care for the dog may be extremely important because they are the ones in charge of everything related to the dog's early environment. The relationship a puppy raiser forms with the dog may influence things such as the types of experiences a dog encounters as a puppy and the relationship a puppy raiser forms with the dog may even impact how a dog forms a relationship with his or her caretaker later on in life. The relationship that forms between a puppy raiser and working dog in

training may even influence the dog's likelihood of succeeding as a working dog. To better understand how the early environment influences working dogs, this dissertation focuses on examining relationships between puppy raisers and guide dogs in training.

Methods Used to Study Human-Dog Relationships

Researchers have examined human-dog relationships using three broad methods: Interactive exercises, interviews, and questionnaires. I describe each of these methods below.

Interactive exercises are ones in which people and dogs participate in some type of task with one another, usually in a laboratory setting. One common task is the Strange-Situation test, which was modified from human studies (the Ainsworth Strange-Situation test; Ainsworth & Wittig, 1969) and aims to assess the attachment the dog forms with his/her owner (e.g., Topál, Gásci, Miklósi, Virányi, Kubinyi, & Csányi, 2005). The Strange-Situation test consists of a series of seven episodes in which a dog and the dog's owner are in a room together. A stranger comes to the room at some point and the owner leaves the room. Researchers examine how the dog reacts to the owner leaving, the stranger being around, and the dog being left in the room by himself/herself. Such interactive exercises allow researchers to get a snapshot of a dog's relationship with his/her owner, but they do not capture everything there is to know about the human-dog relationship. For example, in the Strange-Situation test, it is easy to see how a dog reacts to a stranger in that situation, but it does not show how a dog would react to a stranger in a familiar place or to see how a person interacts with their dog outside of the laboratory setting.

Interviews between researchers and dog caretakers are another method used to understand the human-dog relationship. Interviews allow for an open-ended communication between researchers and dog caretakers. For example, to understand the relationship between mushers and sled dogs, Kuhl (2011) interviewed mushers, asking them to recall stories involving their dogs. Interviews can be effective in understanding the human-dog relationship, but can also be difficult to analyze because interviews need to be transcribed and coded or analyzed through text analysis programs. Interviews also take a lot of time and money to conduct and may be more useful in studies at the exploratory phase of research.

Finally, many questionnaires have been developed to measure the relationship between humans and dogs. Questionnaires facilitate short measurement times, which is an important feature in working-dog organizations where operational considerations require rapid assessments of whether a dog is getting what he/she needs from the puppy raiser. Questionnaires are also easy for working-dog organizations to use because all they need to do is hand out the questionnaire or send a link to an online questionnaire. Questionnaires are also easy and simple for puppy raisers to use. Finally, questionnaires are easy to analyze. In this dissertation I adopt the questionnaire method to allow an easy and effective measure of the relationship between a human and a dog. In addition, I use an interactive exercise to measure observed human-dog relationship behavior and compare the observed behavior with the scores from the questionnaire.

EXISTING QUESTIONNAIRES

Numerous questionnaires have been developed to assess some part of the human-dog relationship (see Appendix A for an overview of questionnaires used to assess the

human-dog relationship). However, there are problems with using these existing questionnaires to assess puppy raiser-dog relationships. First, many of these questionnaires have not been evaluated psychometrically (e.g., by examining the reliability or validity of the measures). For example, Davis (1987) created a questionnaire to examine care and nurturing duties of pet care owners, but no measures of reliability or validity were reported. Many other questionnaires were created to assess any type of pet, without focusing on dogs. These questionnaires are limited because they include very general items designed to capture as many types of pets as possible (e.g., I love pets; Pet Attitude Scale – Modified; Templer, Salter, Dicker, & Baldwin, 1981). Finally, virtually none of these questionnaires were developed to assess puppy raiser-dog relationships. As a result, many items relate to aspects of the relationship that are not applicable to puppy raiser-dog relationships. For example, one item from the Monash Dog Owner Relationship Scale (MDORS; Dwyer, Bennett, & Coleman, 2006) is, ‘My dog costs too much money.’ Most working-dog organizations pay for most of their dogs’ needs, so the puppy raiser does not have to take care of dog-related expenses. In addition, there are other items important to puppy raiser-dog relationships that are not included in any of the questionnaires. For example, the amount and type of socialization is important in working dogs, but the amount and type of socialization is not assessed in any of the current questionnaires. The one questionnaire that does assess a working-dog relationship is the Center for the Study of Animal Wellness Bonding Scale (as cited in Anderson, 2007), which examines how people feel about therapy dogs. This questionnaire focuses on whether people accept and like having a therapy-dog visitor, not on the relationship between one person and one therapy dog, so it is not a useful instrument for the present

study. In sum, the currently available questionnaires are subject to a range of limitations with respect to my research goals. Therefore, one of the major aims of this dissertation is to develop a questionnaire measuring the relationship between puppy raisers and working dogs.

Overview of the Dissertation

The goal of this dissertation is to examine relationships between puppy raisers and dogs in a guide dog organization, Guiding Eyes for the Blind (GEB). In Chapter 2, I focus on the development and pilot testing of the questionnaire used to assess the puppy raiser-dog relationship. The questionnaire was developed by surveying past research examining humans and dogs and by asking experts to come up with items relating to the puppy raiser-dog relationship. The questionnaire was piloted by having staff and previous puppy raisers fill out the questionnaire. The questionnaire was then modified based on pilot testing.

In Chapter 3, I examine the structure of puppy raiser-dog relationships. The final version of the questionnaire was sent out to participants at three time points (4-months, 8-months, and 13-months) while their dogs were in training. A principal component analysis was conducted at each time point to examine the structure of the relationship. At each time point a 5-factor solution was found based on scree plots, parallel analysis, the Bass Ackwards technique, and interpretability of the factors.

In Chapter 4, I examine the generalizability of the relationship factors and items across testing occasions. Participants completed the questionnaire at up to three time points: 4-months, 8-months, and 13-months. Intra-class correlation coefficients were used

to determine if relationship factors and items change across occasions or if they remain consistent.

In Chapter 5, I examine the generalizability of the relationship factors and items across perspectives provided by the puppy raiser (“self”) and others. Informants, people who are familiar with the participant and dog, filled out the questionnaire about the participant’s relationship with their dog. Intra-class correlation coefficients were used to determine if there is agreement between the self and other when rating puppy raiser-dog relationships.

In Chapter 6, I examine the criterion validity of the relationship questionnaire. To do so, I examine scores from dogs’ walk-and-talks, an evaluation the puppy raiser and dog complete at 4-months, 8-months, and 13-months. The walk-and-talk consists of a variety of skills GEB staff ask puppy raisers and dogs to demonstrate. In addition, at the beginning of the walk-and-talk, puppy raisers and dogs go through a standardized Figure-8 exercise, where puppy raisers instruct dogs to walk around cones in a Figure-8 shape. First, I examine the criterion validity of the relationship factors with respect to scores furnished by staff based on the puppy raiser and dog’s performance during the walk-and-talk. Second, I examine the criterion validity of the relationship factors with respect to codings and ratings based on videotapes of behavior in the Figure-8 exercise.

In Chapter 7, I examine the human and dog characteristics that predict puppy raiser-dog relationship factors. Human characteristics are examined by assessing the Big Five personality traits and basic demographics of puppy raisers. Dog characteristics are examined by a behavioral assessment as well as a questionnaire filled out by puppy raisers. Multiple linear regressions are used to examine whether human and dog

characteristics predict relationship factors. Examining which human and dog characteristics are associated with factors of the puppy raiser-dog relationship can improve understanding of the puppy raiser-dog relationship.

Finally, in Chapter 8, I contextualize the findings with respect to previous research on human-dog relationships. I draw a number of broad conclusions and point to directions for future research.

CHAPTER 2: SCALE DEVELOPMENT AND PILOT TESTING

Overview

A questionnaire would be an effective way to assess the relationship between puppy raisers and guide dogs in training. However, the questionnaires that have been previously used are problematic. As previously discussed, virtually no questionnaire has been specifically designed to tap into the relationship between puppy raisers and working dogs, which limits our ability to understand the puppy raiser-dog relationship. Certain items (e.g., socialization, obedience skills) are likely to be especially important in puppy raiser-dog relationships and are not often included in human-dog relationship questionnaires. Other human-animal relationship questionnaires are also problematic because they have not been evaluated psychometrically and they focus on pets, but not specifically dogs. Thus, the aim of this chapter was to develop a questionnaire that can specifically assess the relationship between puppy raisers and guide dogs. The first part of this chapter describes the development of the scale for the questionnaire. The second part describes pilot testing of the questionnaire to examine its effectiveness.

PART ONE: DEVELOPMENT OF THE ITEMS FOR THE QUESTIONNAIRE

The first step in creating the relationship questionnaire was to generate a list of questionnaire items. To do so, I first searched through the relevant literature relating to human-dog relationships. This step included searching for literature examining human-dog a) relationships, b) attachment, and c) bonding. To generate items, I examined existing questionnaires and themes related to the human-dog relationship in the research literature. Additionally, I examined resources that compiled additional questionnaires

relating to the human-dog relationship, such as Anderson's (2007) collection of measurements relating to the human-animal bond. Finally, I asked experts familiar with working dogs to generate items important to the human-dog relationship.

These sources generated an initial item pool of 881 items. Many of the items shared similar content (e.g., items related to petting dogs) and many of them were used in multiple sources; so I grouped items by similarity, resulting in 41 categories. Next, I removed redundant items resulting in a total of 465 items (Appendix B).

I selected a final set of items based on prior research examining components of human relationships (Hinde, 1997). Items were selected based on how well they represented the relationship categories: Content of interactions, qualities of interactions, relative frequency and patterning of interactions, reciprocity vs. complementarity, intimacy, interpersonal perception, and commitment. In addition, I included an 'other' category that did not fit into any of the categories, but appeared to be important to the puppy raiser-dog relationship. Items were then selected based on their relevance to these classifications, resulting in a total of 98 items (included in Appendix C).

These items were refined to make a cohesive questionnaire. Items that were not clear were re-worded to make them clearer (e.g., 'connect with puppy' was changed to 'I feel connected with my dog'). Items that referred to a relationship with a pet were changed to be more specifically about a relationship with a dog (e.g., 'My pet understands me' was changed to 'My dog understands me'). Items that were both positive (e.g., 'I enjoy my play sessions with my dog') and negative (e.g., 'I do not play with my dog very often') were included to reduce the effects of acquiescence bias. Some items had to be reversed to the opposite valence to maintain an appropriate number of

positively and negatively worded items (e.g., I changed ‘my dog can read my body language’ to ‘my dog cannot read my body language’).

Four additional questions were added as open-ended questions. These questions were designed to further explore the relationship and allow puppy raisers to openly describe their relationship with their dog, what kind of other relationship they consider their relationship with their dog to be like (e.g., parent/child, husband/wife, etc.), and why they decided to raise a guide dog puppy. Three final questions were added on the questionnaire to allow participants to provide feedback about the questionnaire itself. These questions asked participants if there were any items on the questionnaire that were not asked that should have been asked, if there were any items on the questionnaire that should not have been asked, and if participants had any general comments about their experience with the questionnaire.

PART TWO: PILOT TESTING OF THE QUESTIONNAIRE

The second goal of Chapter 2 was to pilot test the questionnaire. Before sending the questionnaire out to study participants, the questionnaire needed to be piloted in order to examine any problems with comprehension of items, difficulty of wording, ambiguity of items, or any other potential issues.

Method

Participants

It was essential to identify an appropriate sample for piloting the questionnaire. I wanted to include as many puppy raisers as possible in the final questionnaire, so I did not ask puppy raisers who would be raising a dog during the data-collection period to fill

out the pilot version of the questionnaire. Instead, I recruited Guiding Eyes for the Blind (GEB) staff members that were currently or had previously raised a dog and past GEB puppy raisers that were not planning on raising a dog during the data collection period. Staff, who were raising or had previously raised a dog, knew what it was like to raise a dog, so they could fill out the questionnaire based on their relationship with their own dog. They also provided the unique experience of being able to observe other puppy raisers, including some who had good relationships with their dogs and some who did not. The staff members were also told the details and purpose of the entire study, so they would not be ideal participants for participating in later parts of the study. Past puppy raisers, who were not currently raising dogs, were beneficial because they had been through the experience of raising a dog, so they were able to report on their own relationship with their dog.

24 participants (23 females, 1 male) were included in the pilot testing of the questionnaire. Participants were between 33-60 years ($M = 53.04$, $SD = 12.01$) and dogs were between 3-18-months ($M = 41.70$, $SD = 36.85$). Most of the subject dogs were Labrador Retrievers (79.2%). Most participants (83.3%) had raised a dog for GEB prior to the dog for which they were filling out the questionnaire. Participants that had raised another dog indicated that they had raised between 1-24 dogs ($M = 7.09$, $SD = 5.14$) for GEB in the past.

Procedure

Participants chosen to take part in the pilot testing of the questionnaire were sent a link that directed them to an online questionnaire, which was administered via Qualtrics. The questionnaire consisted of three sections (Appendix C).

Section one examined basic information about participants, including the participant's age and gender, information about the participant's current dog, the number of dogs the participant had raised for GEB, and whether the participant owned any other dogs. Then, the participant was asked to fill out the questionnaire in regards to the last dog they raised or were currently raising for GEB.

Section two consisted of the 98 relationship items of the questionnaire and the four open-ended questions. Participants were instructed to answer questions on a Likert scale, ranging from 1 (*disagree*) to 5 (*agree*). Participants were also given the option to select "not applicable" or "I do not understand". "Not applicable" was used to indicate that participants never experienced that particular behavior or experience. "I do not understand" was used to indicate that participants had trouble understanding an item. Items were randomized for each participant to control for order effects. The four open-ended questions were given at the end of the questionnaire.

Section three consisted of a general feedback section. Participants were asked if they had any general thoughts about the questionnaire and if they had any ideas for items that were not asked that should have been asked or any items that were asked that should not have been asked. Participants were instructed to answer questions in all three sections. Once they submitted their questionnaire, they were thanked for their participation.

Results

One main goal of piloting the questionnaire was to assess whether items were interpretable and applicable. One or more participant flagged 14 of the items as items that they did not understand and 20 items were flagged by participants as not being applicable to them. I examined each of these items.

There were only two items that three or more people marked as being difficult to understand. One item ('I have most of the training classes for my dog') was missing a word when the questionnaire was transferred to Qualtrics, so I fixed it to include the correct wording. The other item ('I see my dog as an extension of myself) was removed from the questionnaire. I reviewed the remaining items for which at least one person indicated they did not understand the item and changed the wording of the item to clarify the item.

There were seven items that three or more people marked as not being applicable to them. All of these items related to raising a puppy for GEB (e.g., I do not often call or email the puppy sitter to ask about my dog when I am away). Many of the participants in the sample were not currently raising dogs, so it would make sense for them to indicate these responses as being not applicable to them. I decided to keep all of these items in the questionnaire because participants taking the final version of the questionnaire would all be current puppy raisers, so all of those items should apply to them.

I next reviewed responses from the final part of the questionnaire in which participants were able to nominate items that they felt were not covered in the questionnaire. Many participants suggested items that were related to the puppy raiser, but not to the relationship itself or were already covered in another item. I ended up adding one item ('I always let my dog sleep in the crate in my bedroom instead of some other place in the house') suggested in an open-ended response that related to the dog-human relationship and that was not already covered in the questionnaire. In addition, I added two items that had to do with the raiser's feelings about how likely the dog was to succeed. One question asked about the dog's likelihood of passing his or her in-for-

training (IFT) test and the other question asked about the dog's likelihood of graduating as a guide dog.

SUMMARY

In the first part of this chapter, a questionnaire was designed to assess the relationship between volunteers raising guide dogs and guide dogs in training. Items were selected based on previous questionnaires and ideas from experts in the field. After categorizing items and eliminating redundancy, a total of 98 relevant items remained. For exploratory purposes, four open-ended questions were added. In the second part of this chapter, 24 participants piloted the questionnaire. Most items were understandable and relevant, but one question was removed because it was not understandable, and 13 items were reworded to make them more coherent. Finally, three questions were added to the final version of the questionnaire.

CHAPTER 3: PRINCIPAL COMPONENT ANALYSIS

Overview

An important first step to understanding the puppy-raiser dog relationship is to understand the structure of the relationship. There are many potential factors that are important in puppy raiser-dog relationships and determining what those factors are can help us better understand these relationships. Some previous studies have examined factors related to human-animal relationships, which can give us a starting place at understanding puppy raiser-dog relationships. Some common factors examined from the human-dog relationship literature are described below.

First, studies show care or costs of caring for a dog or animal is an important part of the human-dog relationship. Many studies have examined the general care of a dog (Archer & Ireland, 2011; Davis, 1987; Dwyer, Bennett, & Coleman, 2006), which involves aspects such as making sure the dog is well cared for when the owners are away (Archer & Ireland, 2011). Other studies have examined care by the commitment level of the owners (Johannson, 1999; Staats, Miller, Carnot, Rada, & Turnes, 1996) and found aspects such as how committed owners are to keep dogs, even when there are challenges to keeping dogs (Staats, Miller, Carnot, Rada, & Turnes, 1996). Studies have also examined the financial costs and value of animals (Poresky, Hendrix, Mosier, & Samuelson, 1988), the affective value of animals (Poresky, Hendrix, Mosier, & Samuelson, 1988), making specialty purchases for dogs (Dotson & Hyatt, 2008), and the costs of caring for a dog, including both monetary aspects and responsibility aspects (Dwyer, Bennett, & Coleman, 2006).

Second, studies show attitudes toward dogs and animals are part of the human-dog relationship. Some studies have found that dogs bring joy to people (Templer, Salter, Dicker, & Baldwin, 1981), that dogs bring attitudes of love and affection to people (Poresky, Hendrix, Mosier, & Samuelson, 1988; Templer, Salter, Dicker, & Baldwin, 1981), and that some people regret owning a dog (Schneider, Lyons, Tetrick, & Accortt, 2010), suggesting people have different attitudes toward owning dogs. Other studies have examined how owners think about dogs and found owners respect them (Kuhl, 2011) and have anthropomorphic views about them (Dotson & Hyatt, 2008). Studies have also examined children's treatment and attitudes of animals (Guymer, Mellor, Luk, Pearse, 2001; Thompson & Gullone, 2003), including children's typical and malicious cruelty to animals (Guymer, Mellow, Luk, Pearse, 2001).

Third, studies show interactions people have with dogs are important aspects of the human-dog relationship. Studies have examined communication with dogs is important (Kuhl, 2011), such as being partners with dogs (Kuhl, 2011), and trusting dogs (Kuhl, 2011). Other studies have examined activities children share with animals such as taking dogs for a walk (Thompson & Gullone, 2003) and skills relating to basic and advanced obedience (Walton & McConocha, 1996). Studies have also examined the companionship owners feel with animals (Kafer, Lago, Wambolt, & Harrington, 1992; Schneider, Lyons, Tetrick & Accortt, 2010) and found aspects of companionship such as showing affectionate companionship (Kafer, Lago, Wambolt, & Harrington, 1992). Finally, studies have examined relationships in terms of support and conflict (Bonas, McNicholas, & Collis, 2000, Enders-Siegers, 2000), which is comparable to relationships between two humans.

Fourth, studies examine the level of attachment as a part of the human-dog relationship. Many studies have examined general human-dog attachment levels (Johnson, Garrity, & Stallones, 1992; Schneider, Lyons, Tetrack & Accortt, 2010) such as the dog wanting to be physically close to a person (Schneider, Lyons, Tetrack & Accortt, 2010). Other studies have examined attachment by the emotional closeness owners feel with their dogs (Archer & Ireland, 2011; Dwyer, Bennett, & Coleman, 2006). One study also examined behavioral, affective, and cognitive attachment (Melson, Peet, & Sparks, 1991) between owners and dogs. Finally studies have examined the pet being a central part of the owner's life (Johnson, Garrity, & Stallones, 1992) and the pet's status within the house (Johnson, Garrity, & Stallones, 1992). These studies suggest some people can be more strongly attached to their dogs than others.

Fifth, studies show attachment styles relating to the human-dog relationship. Studies have examined attachment in regards to secure and insecure attachment (Archer & Ireland, 2011; Zilca-Mano, Mikulincer, & Shaver, 2011). Other studies have examined other aspects of attachment such as separation-related behaviors (Rooney & Bradshaw, 2003), relationship maintenance (Holcomb, Williams, & Richards, 1985), intimacy (Holcomb, Williams, & Richards, 1985), and attention seeking (Rooney & Bradshaw, 2003). These studies suggest there are different attachment styles in reference to the human-dog relationship.

In summary, previous research has made big strides in understanding the structure of human-dog relationships. However, the relationships between puppy raisers and guide dogs in training have not been studied in detail. The unique nature of this relationship suggests that one cannot simply generalize from the human-dog relationship to the puppy

raiser-dog relationship. Therefore, the purpose of Chapter 3 was to identify and name the factors relating to the puppy raiser-dog relationship. To do so, I used a principal component analysis (PCA) separately at three time points when participants filled out the questionnaire. I used several criteria to determine the number of factors at each age, which included a scree test (Cattell, 1966), parallel analysis (Horn, 1965), the Bass Ackwards technique (Goldberg, 2006), and the interpretability of the factors (Velicer, Eaton, & Fava, 2000). Finally, I examined the similarity of the factors at each age to determine if the factor structure was the same at each age.

METHOD

Participants

Participants for Chapter 3 were puppy raisers for GEB, which included 131 (120 female) puppy raisers with dogs approximately 4-months of age, 124 (109 female) puppy raisers with dogs approximately 8-months of age, and 140 (119 female) puppy raisers with dogs approximately 13-months of age. Based on the timing of the study, some participants rated dogs at more than one time point, but some participants rated dogs at only one time point. 47 participants rated dogs at 4-months and 8-months and 46 participants rated dogs at 8-months and 13-months. Participants did not include puppy raisers and staff who had filled out the pilot version of the questionnaire. The participants were notified about the study and filled out the questionnaire between April 2014 and February 2015. Of 463 unique participants emailed about the study, 302 unique participants completed the questionnaire (65.2%).

Procedure

All puppy raisers for GEB were sent an email from GEB staff introducing them to the study in April 2014. The email was then posted on GEB's website, so any puppy raiser that joined the organization after April 2014 was notified about the study. Puppy raisers were eligible to participate in the study if they had a valid email address and their dog participated in a walk-and-talk. All puppy raisers eligible to participate were sent an individualized email shortly after their dog had completed a walk-and-talk (at approximately 4, 8, and 13-months of age). Walk-and-talks are formal evaluations staff conducted with dogs at each of the ages. The email included an explanation of the study, a participation ID number, and a link to the questionnaire. If participants did not complete the questionnaire, they were sent a reminder email each week to remind them to participate. Participants were sent up to three reminder emails to participate. In the final reminder email, participants were notified that email was their last reminder email to complete the questionnaire.

Once participants clicked on the link to the questionnaire, they were asked to give consent to fill out the questionnaire and to have videos from the walk-and-talk analyzed by the researchers. If participants did not give consent to allow researchers to analyze the videos, they could still complete the questionnaire, but their videos were not examined. If participants did not give consent to participate in the study, they were directed to the end of the questionnaire and thanked for their help.

After participants gave consent information, they were asked their ID number and their dog's name for identification purposes. To make sure to match participants with walk-and-talk data and Figure-8 videos, participants were then asked if they handled the

dog during the Figure-8 exercise from their dog's last walk-and-talk. If participants chose no, they were asked leave an email address of someone who did handle the dog during the Figure-8 exercise and were then directed to the end of the questionnaire. 15 people indicated they did not handle the dog during the Figure-8 exercises and emails were re-sent to the 15 people that did handle the dog during the Figure-8 exercise. If participants chose yes, they proceeded on with the questionnaire. Participants were then asked to provide additional information about their experience with their dog, including whether they co-raised the dog with someone else and the number of other people with whom they co-raised the dog.

Participants were then asked basic demographic information about themselves (age, gender), their dog (age, sex, breed), and past dog experience (information about other dogs in the household and the number of previous dogs they raised for GEB). Finally, participants were asked to provide the names and email addresses of up to three people who knew about them and their relationship with their GEB dog, which was used to assess generalizability between self and other raters.

Participants were then presented with the 100 items from the questionnaire (see Appendix D for final questionnaire items). Questions were displayed in a randomized order, with the exception of two questions ('Based on your own current knowledge about your dog, how likely do you think it is that your dog will pass his/her IFT?', 'Based on your current knowledge about your dog, how likely do you think it is that your dog will graduate as a guide dog?') which were always displayed as the last two items.

Participants were shown 25 questions per page. With each item, participants answered

based on a 5-point Likert scale ranging from “strongly disagree” to “strongly agree”. Participants were also given an option to select “not applicable”.

The next part of the questionnaire assessed the participant’s personality. Participants filled out the Big Five Inventory (BFI; John & Srivastava, 1999; Appendix E), a 44-item questionnaire that assesses the Big Five personality dimensions (Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness).

The final part of the questionnaire included five open-ended questions about the participant’s relationship with his/her dog. In addition, participants were asked a question about how they felt their relationship with their dog compared to (e.g., mentor/mentoree, parent/child), and a question asking if the participant was planning on raising another guide dog puppy. Once participants completed those final questions, they were thanked for their participation.

Data analysis

Prior to analysis, the data was examined to search for any errors. Two cases were removed because the same participant had filled out the questionnaire more than once at the same age. 19 participants were removed because more than half of their responses to the questionnaire were left blank. To determine if any participant responded in the same manner to most questions, the standard deviation of all the questionnaire items was assessed. No cases were removed due to a low variability in responses. To reduce response-set bias, each participant’s responses to the questionnaire were ipsatized (across relationship questionnaire items) by using z-scores, which gave each participant’s scores a mean of 0 and variance of 1 (Cunningham, Cunningham, & Green, 1977).

The distribution of each item was also examined prior to analysis in order to determine if any item may not be suitable for analysis. Four items ('I do not pet my dog frequently', 'I do not understand my dog very well', 'I do not feel like I have an emotional connection with my dog', and 'I am not very attached to my dog') were taken out of the analysis because they had high kurtosis (>5) at all three of the time points. In addition, three items ('My dog often shows signs of distress e.g., whining when I am away', 'My dog is left alone without people for several hours a day', and 'Taking care of my dog comes with the same responsibilities as taking care of a child') were taken out of the analysis after examining the data because they did not load on a factor at any age.

A principal component analysis (PCA, varimax rotation) was used to examine the structure of the questionnaire. To assess the sampling adequacy both Bartlett's (1950) test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy were used. Bartlett's test of sphericity tests whether the correlation matrix is the same as an identity matrix, where the diagonals are 1 and off-diagonals are 0 (Bartlett, 1950). Bartlett's test should be significant for the data to be considered suitable for factor analysis. KMO is the ratio of the squared correlation between variables and the squared partial correlations between variables. KMO can be between 0 and 1 and a score close to 1 indicates factor analysis should yield distinct and reliable factors (Kaiser, 1970). KMO greater than 0.60 is generally considered suitable for factor analysis (Kaiser, 1970).

To determine the number of factors to extract from the PCA, I used a scree test (Cattell, 1966), a parallel analysis (Horn, 1965), the Bass Ackwards technique (Goldberg, 2006), and the interpretability of the factors (Velicer, Eaton, & Fava, 2000). The scree test plots eigenvalues obtained from the PCA onto a scree plot. The number of factors to

extract is based on finding a break in the eigenvalues when the plot levels off, typically seen as an elbow (Cattell, 1966).

Parallel analysis uses a comparison of eigenvalues extracted from the correlation matrix to those obtained from uncorrelated normal variables. In parallel analysis, factors are extracted based on the number of factors that account for more variance than factors that come from simulated data (Horn, 1965). To do the parallel analysis, I used 1,000 simulated data sets that contained the same number of items and participants as the original data set. I then compared the eigenvalues from the simulated data to the eigenvalues from the original data set to determine the number of factors to extract (O'Connor, 2000).

The Bass Ackwards technique uses factor scores obtained from an increasing number of factors and correlates the factors scores with one another to better examine the hierarchical structure of the factors. The ideal solution is when the major factors stop breaking down and no variable has its highest factor loading (Goldberg, 2006). In this case, I looked at the factor scores obtained when 2-11 factors were extracted.

Interpretability of the factors relies on interpreting the factors in a meaningful way. If the factors cannot be interpreted, the solution should not be used, even if other criteria indicate a certain number of factors should be retained. When examining data with a large number of items such as in this case, many of these methods can lead to extracting too many factors (Zwick & Velicer, 1982). Therefore, I chose the number of factors based on the convergence across these methods as well as a solution that allowed for the most simplistic, but interpretable explanation of the data.

To determine if the factor structure was the same structure at each age I conducted Procrustean rotations and calculated Tucker's Coefficient of Congruence based on the rotations (Lorenzo-Seva & ten Berge, 2006; McCrae, Zonderman, Bond, Costa, & Paunonen, 1996). Procrustes rotations force the data to conform to a predetermined structure (Digman, 1967). Procrustes rotations and Tucker's Coefficient of Congruence were conducted between the 4 and 8-month solution and the 8 and 13-month solution.

In addition, I examined the correlation between the factor loadings computed at each age. Correlations of factor loadings were conducted to determine if any factor solution was the same at another age. For example, does the 4-factor solution at 4-months correlate with the 5-factor solution at 8-months? To do so, I conducted a PCA and extracted 2-11 factors at each age. I then correlated the factor loadings from 2-11 factors at each age with the factors loadings from 2-11 factors at each age. For example, at 4-months, the 2 factor loadings were correlated with the 2 factor loadings at 8-months, the 3 factor loadings at 8-months, the 4 factor loadings at 8-months, and so on. All correlations were done after transforming the loadings using Fisher's r to z formula.

Factor scores were computed from the items loading strongly on each factor. Commonly used factor-loading thresholds are 0.30 or 0.40 (Floyd & Widaman, 1995). To include as many items as possible that were meaningful across the different time points, items above 0.30 were included. To compute the final factor scores, all negative items were reverse scored. Then scale scores were computed from the average of the unit-weighted items loading on each factor.

RESULTS

Principal Component Analysis

4-months

At 4-months of age, Bartlett's test of sphericity was significant ($\chi^2 = 6189.75$, $p < 0.001$), indicating good sampling adequacy. KMO was 0.10, below the 0.60 cut-off that suggests good sampling adequacy. In an attempt to improve KMO, I redid the analysis removing any item with low kurtosis. When these items were removed, KMO was still below the 0.60 cut-off, so I proceeded with the analysis with the original items included.

Both the scree plot and the parallel analysis suggested retaining 7 factors (Figures 1 and 2). The Bass Ackwards method suggested a 5-factor solution could be used (Figure 3). The 5-factor solution was also interpretable and all factors could be named easily. Based on all the criteria, I decided to use a 5-factor solution for the 4-month questionnaire (see Table 1).

The first factor consists of 16 items (Cronbach's $\alpha = 0.80$). Items loading strongly on this factor are 'I find it easier to talk to my dog than to people', 'My dog acts like a person, not a dog', and 'I often tell my dog things I don't tell anyone else'. These items have to do with participants treating or thinking of their dogs like humans and was thus labeled 'Anthropomorphism'.

The second factor consists of 14 items (Cronbach's $\alpha = 0.70$). Items loading strongly on this factor are 'My dog does not always respond when I give him/her commands (negative loading)', 'My dog always pays attention to me and obeys me right away', and 'My dog is constantly attentive to me'. These items relate to the dog's

responsiveness to commands, their obedience, and how attentive the dog is and was thus labeled 'Obedience'.

The third factor consists of 16 items (Cronbach's $\alpha = 0.67$). Items loading strongly on this factor are 'My dog and I have a very close relationship', 'I sometimes give my dog table scraps', and 'My dog is bonded with me'. These items relate to how close the dog and participant feel to one another and thus was labeled 'Closeness'.

The fourth factor consists of 13 items (Cronbach's $\alpha = 0.64$). Items loading strongly on this factor are 'I feel like I have good dog sense when interacting with my dog', 'I can read my dog's body language', and 'I feel like my dog is a wonderful companion for me'. These items relate to how well the participant trained their dog and understood what their dog needed and was thus labeled 'Understanding of dog'.

The fifth factor consists of 14 items (Cronbach's $\alpha = 0.65$). Items loading strongly on this factor are 'Someone else other than me is usually the one that takes care of my dog (negative loading)', 'I am the one most likely to notice when my dog is not feeling well', and 'I interact or have close contact with my dog for a majority of the time I am awake'. These items relate to how much a participant takes care of the dog in various ways and was thus labeled 'Care of dog'.

8-months

At 8-months of age, Bartlett's test of sphericity was significant ($\chi^2 = 5986.10$, $p < 0.001$), indicating good sampling adequacy. KMO was 0.31, below the 0.60 cut-off that suggests good sampling adequacy. In an attempt to improve KMO, I redid the analysis removing any item with low kurtosis. When these items were removed, KMO was still below the 0.60 cut-off, so I proceeded with the analysis with the original items included.

The scree plot suggested retaining 4, 5, or 8 factors (Figure 4). The parallel analysis suggested retaining 8 factors (Figure 5). The Bass Ackwards method suggested a 5 and 7-factor solution could be used (Figure 6). The 5-factor solution was retained in order to use the most simplistic solution that is still interpretable (see Table 2).

The first factor consists of 23 items (Cronbach's $\alpha = 0.69$). Items loading strongly on this factor are 'My dog and I have a very close relationship', 'My dog always pays attention to me and obeys me right away' and 'Taking care of my dog has increased the stress in my life (negative loading)'. These items relate to the dog's responsiveness to commands, their obedience, and how attentive the dog is and was thus labeled 'Obedience'.

The second factor consists of 16 items (Cronbach's $\alpha = 0.70$). Items loading strongly on this factor are 'I play with my dog all the time (negative loading)', 'I treat my dog as a dog, not as a person', and 'My dog does not understanding my feelings'. These items have to do with participants treating or thinking of their dogs like humans and was thus labeled 'Anthropomorphism'.

The third factor consists of 12 items (Cronbach's $\alpha = 0.52$). Items loading strongly on this factor are 'I find it easier to talk to my dog than to people (negative loading)', 'I often tell my dog things I don't tell anyone else (negative loading)', and 'I socialize my dog at least several times a week'. These items relate to how close the dog and participant feel to one another and thus was labeled 'Closeness'.

The fourth factor consists of 10 items (Cronbach's $\alpha = 0.50$). Items loading strongly on this factor are 'My dog is not interested in playing with me', 'My dog is bonded with me (negative loading)', and 'I feel like I have good dog sense when

interacting with my dog'. These items relate to how much the person seems to understand what their dog is like and the types of things their dog needs and was thus labeled 'Understanding of dog'.

The fifth factor consists of 10 items (Cronbach's $\alpha = 0.38$). Items loading strongly on this factor are 'I am the person that feeds my dog on a daily basis', 'I am the person that checks to make sure my dog has water on a daily basis', and 'My dog spends more time with me than he/she does with anyone else'. These items have to do with how much a participant takes care of the dog in various ways and the time the dog and participant spend with one another and thus was labeled 'Care of dog'.

13-months

At 13-months of age, Bartlett's test of sphericity was significant ($\chi^2 = 6110.56$, $p < 0.001$), indicating good sampling adequacy. KMO was 0.35, below the 0.60 cut-off that suggests good sampling adequacy. In an attempt to improve KMO, I redid the analysis removing any item with low kurtosis. When these items were removed, KMO was still below the 0.60 cut-off, so I proceeded with the analysis with the original items included.

The scree plot suggested retaining a total of 5 or 9 factors (Figure 7). The parallel analysis suggested retaining a total of 9 factors (Figure 8). The Bass Ackwards method suggested a 5-factor or 11-factor solution could be used (Figure 9). The 5-factor solution was interpretable and so I used the 5-factor solution in order to use the most simplistic solution that is still interpretable (Table 3).

The first factor consists of 19 items (Cronbach's $\alpha = 0.85$). Items loading strongly on this factor are 'I talk to my dog about things like what is going on in my life often', 'I often tell my dog things I don't tell anyone else', and 'My dog does not understand my

feelings'. These items have to do with participants treating or thinking of their dogs like humans and was thus labeled 'Anthropomorphism'.

The second factor consists of 11 items (Cronbach's $\alpha = 0.70$). Items loading strongly on this factor are 'My dog does not always respond when I give him/her commands', 'My dog always pays attention to me and obeys me right away (negative loading)', and 'My dog is constantly attentive to me (negative loading)'. These items relate to the dog's responsiveness to commands, their obedience, and how attentive the dog is and was thus labeled 'Obedience'.

The third factor consists of 12 items (Cronbach's $\alpha = 0.73$). Items loading strongly on this factor are 'My dog spends more time with me than he/she does with anyone else (negative loading)', 'Someone else other than me is usually the one that takes care of my dog', and 'I am the person that feeds my dog on a daily basis (negative loading)'. These items have to do with how much a participant takes care of the dog in various ways and the time the dog and participant spend with one another and thus was labeled 'Care of dog'.

The fourth factor consists of 14 items (Cronbach's $\alpha = 0.69$). Items loading strongly on this factor are 'My dog chews on things he/she is not supposed to chew on (negative loading)', 'I spend time every day training my dog', and 'I socialize my dog at least several times a week'. These items relate to how well the participant trained their dog and understood what their dog needed and was thus labeled 'Understanding of dog'.

The fifth factor consists of 10 items (Cronbach's $\alpha = 0.59$). Items loading strongly on this factor are 'My dog and I have a very close relationship', 'My dog is bonded with me', and 'My dog pays more attention to strangers than he/she does with me (negative

loading)'. These items relate to how close the dog and participant feel to one another and thus was labeled 'Closeness'.

Congruence of factors

Congruence coefficients computed after procrustean rotations between factors showed evidence for congruence between 4 and 8-months for the factor Anthropomorphism (0.90), but not for Obedience (0.72), Understanding of dog (0.61), Closeness (0.64), or Care of dog (0.63). Congruence coefficients computed after procrustean rotation showed evidence for congruence between 8 and 13-months for the factors Understanding of dog (0.86) and Care of dog (0.98), but not for Anthropomorphism (0.75), Obedience (0.64) or Closeness (0.13).

Correlations of factor loadings were conducted when between 2-11 factors were extracted. There was some similarity between factors, but not for all factors. For example, for the 4-month 4-factor solution, there was a correlation between factor 1 and factor 2 of the 8-month 5-factor solution and between factor 4 and factor 5, but no correlation between any of the other factors. There is no solution at any age in which there is convergence across all factors.

The congruence coefficients point to slight differences in how the factors are defined across the age periods. For example, the items that represented Closeness at 4-months were slightly different from those representing Closeness at 8-months. Therefore, when referring to the age-specific factors, the age of measurement is flagged by a suffix indicating the relevant age group (e.g., Closeness derived from data collected at 4-months is written as Closeness-4).

SUMMARY

The relationship questionnaire was given to 131 participants at 4-months, 124 participants at 8-months, and 140 participants at 13-months. At each age a PCA was conducted to determine the structure of the questionnaire. Five factors represented the questionnaire at 4, 8, and 13-months and were labeled as ‘Anthropomorphism’, ‘Obedience’, ‘Closeness’, ‘Understanding of dog’, and ‘Care of dog’. The composition and structure of the factors changed somewhat at each age and so a different factor structure was retained at each age.

CHAPTER 4: GENERALIZABILITY ACROSS TESTING OCCASIONS

Overview

One indicator of the quality of a measurement instrument is the degree to which it generalizes across different facets of measurement, such as measurement occasions, measurement types, measurement sources, and so on. The present chapter examines the degree to which the puppy raiser-dog questionnaire developed in Chapter 2 generalized across testing occasions. Then in Chapter 5, I shall evaluate the extent to which the questionnaire generalizes across measurement sources.

A common way of assessing generalizability across measurement occasions (i.e., consistency) is in terms of the test-retest reliability of the questionnaire. Many of the previous questionnaires designed to examine the human-animal relationship did not report any findings on test-retest reliability. However, four previous questionnaires did examine test-retest reliability and they provide evidence for good test-retest reliability, at least when the intervals between the tests are between 2-weeks and 6-months.

The Pet Attitude Scale, which examines people's attitudes towards owning pets, was given to participants twice with a 2-week interval between tests; the test-retest reliability was 0.92 (Templer, Salter, Dickey, Baldwin, & Velebar, 1981). The Children's Attitudes and Behaviors Towards Animals, which examines child's cruelty to animals, was given to participants twice with a 2-week interval between tests; the test-retest reliability was 0.98 (Guymer, Mellow, Luk, & Pearse, 2001). The Children's Treatment of Animals Questionnaire, which assesses children's behavior toward non-human animals, was given to elementary school children twice, with a 5-week interval between

tests; the test-retest reliability was 0.64 (Thompson & Gullone, 2003). Finally, the Pet Attachment Questionnaire, which assesses attachment patterns in relationships, was given to participants twice with a 6-month interval between tests; the test-retest reliability was 0.75 for attachment anxiety and 0.80 for avoidant attachment (Zilcha-Mano, Mikulincer, & Shaver, 2011). These studies provide evidence for relatively good test-retest reliability (between 0.64 - 0.98) with intervals up to 6-months.

Despite this promising evidence, none of these previous studies examined test-retest reliability during the dog's first year of life. This gap in the literature could be important because dogs go through many developmental changes early in life, which may cause the human-dog relationship to change. For example, young dogs go through hormonal changes, which influences their behavior (Lindsay, 2001). Also, research has shown personality is less consistent in younger dogs than older dogs and some traits (e.g., aggression) are more consistent than others (e.g., responsiveness to training) in puppies (Fratkin, Sinn, Patall, & Gosling, 2013). The dog's characteristics likely influence the relationship and if the dog's characteristics change, the relationship may change as well. In addition, it takes time for a relationship to form and previous research has shown attachment between dogs and owners is higher for owners who have owned dogs for a longer period of time than for owners who have owned dogs for a shorter period of time (Bagley & Gonsman, 2005; Marinelli, Adamelli, Normando, & Bono, 2007). The dogs in the current study are young and are just starting to form relationships with puppy raisers, making tests of generalizability across testing occasions particularly necessary.

If the generalizability is strong, that suggests both that the instrument is a good one and that the puppy raiser-dog relationship shows some temporal consistency.

However, if the generalizability turns out to be low that could either be because the instrument is a poor one or because the relationship has changed. To evaluate generalizability across testing occasions, participants were given the questionnaire at up to three different times in their dog's life (at approximately 4, 8, and 13-months).

METHOD

Participants

Participants for Chapter 4 were the same puppy raisers who filled out the questionnaire, as reported in Chapter 3. Participants who completed a questionnaire at 4-months were sent a follow up email and asked to complete the same questionnaire at 8-months. Participants who completed a questionnaire at 8-months were sent a follow up email and asked to complete the same questionnaire at 13-months. 47 (45 female) of the same participants from Chapter 3 completed the questionnaire at both 4 and 8-months and 46 (43 female) of the same participants from Chapter 3 completed the questionnaire at both 8 and 13-months.

Procedure

The participants in this study were the same as in Chapter 3, so the procedure is the same from Chapter 3. When participant's dogs completed their 8-month and/or 13-month walk-and-talk, participants were sent an email with a link to a follow-up questionnaire. The follow-up questionnaire was slightly modified so participants did not complete questions about demographics or personality questions again. Participants only answered questions about whether or not they handled the dog during the Figure-8

exercise, the 100 questions from the relationship questionnaire, and the open-ended questions.

Data analysis

To examine if there was generalizability across measurement occasions, intra-class correlations (ICCs) were used (Shrout & Fleiss, 1979). ICCs assess generalizability by comparing the variability of different testing occasions of the same subject to the total variation across all occasions and all subjects. ICCs were assessed at both the item and factor level.

RESULTS

There was good generalizability across occasions for some items in comparison to previous research examining test-retest reliability of relationship questionnaires, which gave estimates between 0.64 to 0.98 (Table 4). Between 4-months and 8-months, average generalizability was 0.61 and ranged from -0.01 for 'I have attended most of the training classes with my dog' to 0.88 for 'Having to give up my dog is the most difficult part of raising my dog'. Between 8-months and 13-months of age, average generalizability was 0.64 and ranged from 0.11 for 'My dog learns very slowly in comparison to other dogs' to 0.90 for 'I find it easier to talk to my dog than to people'.

There was evidence for good generalizability across testing occasions for most factors between 4-months and 8-months and between 8-months and 13-months. Between 4-months and 8-months, generalizability was 0.76 for Anthropomorphism, 0.69 for Obedience, 0.50 for Understanding of dog and 0.76 for Care of dog. Between 8-months and 13-months, generalizability was 0.79 for Anthropomorphism, 0.73 for Obedience,

and 0.57 for Care of dog. Generalizability across testing occasions was low for Closeness between both 4-months and 8-months (0.01) and 8-months and 13-months (-0.12). Generalizability was also low for Understanding of dog between 8-months and 13-months (0.38).

SUMMARY

Generalizability across testing occasions was assessed by examining the consistency of ratings made by the 47 participants who filled out the questionnaire at both 4-months and 8-months and by the 46 participants who filled out the questionnaire at both 8-months and 13-months of age. Generalizability in the present study was compared to previous studies on test-retest reliability of relationship questionnaires. Some items showed better generalizability than did others, but several items showed relatively good generalizability. Most factors showed good generalizability with the exception of Closeness at both times tested and Understanding of dog between 8-months and 13-months.

CHAPTER 5: GENERALIZABILITY ACROSS SELF AND OTHER PERSPECTIVES

When a person describes their relationship with their dog, they describe their own perception of the relationship. Their perception of their relationship probably captures an element of reality about the relationship but may also include an element of bias. Thus, another index of a measurement instrument's quality is the degree to which it generalizes across different informant sources. Common ways of assessing generalizability across measurement sources are inter-observer reliability and self-other agreement.

No previous studies on human-dog relationships have examined self-other agreement or any form of generalizability across raters, but examining generalizability across rater is important, especially in the context of GEB puppy raiser-dog relationships. Much of GEB's training is focused on the relationship that forms between the raiser and the dog. If raisers view their relationship with their dog in one way, but others view their relationship with their dog in another way, then it is important to examine which view is most accurate to help with training. For example, if Michelle feels like her dog, Petey, is very responsive to the down command, but Allie feels like Petey is not very responsive to the down command, more information is needed to advance Michelle and Petey's training. If Petey is actually very responsive, then Michelle and Petey may be able to move onto more advanced commands, but if Michelle and Petey do not actually have a good grasp on the command, it may be better for them to focus their training more on basic commands.

Without research on self-other agreement in other human-dog relationship studies, it is difficult to know what constitutes good generalizability across raters. Taking a broader perspective on the literature, there is some research that has examined generalizability across raters in studies of dog personality. These studies are similar to human-dog relationships insofar as assessing personality in dogs also relies on rating items based on how a person views their dog. In an analysis of inter-observer reliability from many studies of dog personality, the average inter-observer reliability was 0.60 (Jones & Gosling, 2005). More recent studies of inter-observer reliability have found similar or higher numbers (Fratkin, Sinn, Thomas, Hilliard, Olson, & Gosling, 2015; Sinn, Gosling, & Hilliard, 2010; Valsecchi, Barnard, Stefanini, & Normando, 2011), which suggests in this study, self-other agreement may be considered good around 0.60.

In this chapter, I examined the generalizability of self and other ratings of puppy raiser-dog relationships. People who know the puppy raisers and the dogs served as informants; so they also filled out the relationship questionnaire, but did so with regard to the participant's relationship with their dog. I assessed the degree to which scores on the questionnaire items generalized across the self and other perspectives. I ran these analyses both at the level of individual items and broad factors (the ones derived in Chapter 3).

METHOD

Participants

Participants were the same puppy raisers who filled out the questionnaire in Chapter 3. When participants filled out the questionnaire, they were asked to provide

email addresses for up to three people who were familiar with their relationship with their dog. These informants were asked to fill out the questionnaire about the puppy raiser's relationship with their dog to examine the generalizability across self and other perspectives. Of the 131 participants at 4-months, 70 participants had at least one informant response. Of the 124 participants at 8-months of age, 66 participants had at least one informant response. Of the 140 participants at 13-months of age, 69 participants had at least one informant response (see Table 5).

Procedure

The same procedure was followed as that described in Chapter 3. When participants took the questionnaire, they were asked to provide email addresses for up to three people who knew about them and their relationship with their dog. They were told that these people would be sent an email shortly after they completed the questionnaire and would be asked to also fill out a questionnaire.

The informants were sent an email inviting them to participate in the study about less than a week after the participant filled out the study. In the email, informants were told the name of the participant and the participant's dog and asked to fill out the questionnaire in reference to them. The informants were then given a link to the questionnaire. If informants did not fill out the questionnaire within two weeks, they were sent a follow-up email asking them to participate. Of the 606 informants emailed, 335 informants filled out the questionnaire (55.3% response rate).

The first part of the questionnaire asked for the informant to give consent to participate in the study. If informants did not give consent, they were directed to the end of the questionnaire and thanked for their cooperation. If informants gave consent, they

continued on with the rest of the questionnaire. All informants that started the questionnaire gave consent and continued on with the questionnaire.

Informants then were asked to provide information about their relationship with the participant. They were asked their ID and the name of the participant's dog about which they were completing the questionnaire. Then, they were asked how long they had known the participant, how long they had known the participant's dog, and what their relationship with the participant was.

Finally, informants were asked to fill out the questionnaire based on how they saw the relationship between the participant and the participant's dog. Items were rephrased so that they were about the participant's relationship with their dog and not about the informant participant's relationship with the dog (e.g., 'I play fetch with my dog often' was changed to 'He/she plays fetch with his/her dog often'; Appendix F). Items were displayed in a randomized order with 25 items on the page at one time. After informants filled out the last item, they were thanked for their participation in the study.

Data analysis

Participants included email addresses for between zero and three potential informants. Therefore, not all participants had the same number of informants rate their relationship with their dog. For the analysis of generalizability across self and other perspectives, if more than one informant rated the same participant, the aggregate of the informant responses was taken.

In order to measure the generalizability across self and other ratings of the questionnaire, intra-class correlations (ICCs) were used (Shrout & Fleiss, 1979). ICCs assess generalizability across self and others by comparing the variability of different

ratings of the same subject to the total variation across all ratings and all subjects. ICCs between participants and informants were assessed at both the item and factor level.

RESULTS

Generalizability across self and other perspectives

Informant demographic information is listed in Table 5.1. At each of the three time periods, average self-other agreement was lower than previous dog personality studies, which found an average inter-observer reliability of 0.60 (Table 6). At 4-months of age, the average agreement was 0.26 and the items ranged from -0.73 for 'My dog is bonded with me' to 0.79 for 'I am the person that feeds my dog on a daily basis'. At 8-months of age, average agreement was 0.29 and the items ranged from -0.55 for 'My dog does not look at me often' to 0.83 for 'I sometimes give my dog table scraps'. At 13 months of age, average agreement was 0.27 and the items ranged from -0.35 for 'I enjoy playing with my dog' to 0.67 to 'My dog chews on things that he/she is not supposed to chew on'.

Self-other agreement was higher and more comparable to dog personality studies for most of the factors. At 4-months, agreement was 0.60 for Anthropomorphism-4, 0.50 for Obedience-4, 0.61 for Closeness-4, 0.29 for Understanding-4, and 0.56 for Care-4. At 8-months, agreement was 0.53 for Anthropomorphism-8, 0.33 for Obedience-8, 0.54 for Closeness-8, 0.49 for Understanding-8, and 0.44 for Care-8. At 13-months, agreement was 0.47 for Anthropomorphism-13, 0.55 for Obedience-13, 0.50 for Closeness-13, 0.55 for Understanding-13, and 0.48 for Care-13. Item and factor averages did not appear to vary based on the age of the dog.

SUMMARY

Generalizability across self and other perspectives was assessed by examining informant ratings of relationship scores at 4-months, 8-months, and 13-months of age. Average self-other agreement was low (around 0.30 to 0.50) in comparison to studies of inter-observer reliability in dog personality. Some items showed better agreement than did others and most factors with the exception of Understanding-4 and Obedience- 8 showed slightly lower self-other agreement in comparison to studies of inter-observer reliability in dog personality. Self-other agreement does not appear to change when dogs are older.

CHAPTER 6: CRITERION VALIDITY

Overview

The relationship questionnaire in this study was designed to measure the relationship between puppy raisers and dogs and to encompass as many aspects of the puppy raiser-dog relationship as possible. Questionnaires can be informative and data collection using questionnaires is easy, but questionnaires responses may not predict behavior. One way to examine the questionnaire's ability to translate to behavior is to correlate the questionnaire with a criterion measure obtained from behavioral observations of puppy raiser-dog relationships.

Previous research examining the validity of human-dog relationship questionnaires has mostly been focused on examining the construct validity of questionnaires (Guymier, Mellor, Luk, & Pearse, 2001; Poresky, Hendrix, Mosier, & Samuelson, 1987; Poresky, Hendrix, Mosier, & Samuelson, 1988; Schneider, Lyons, Tetrick, & Accortt, 2010; Staats, Miller, Carnot, Rada, & Turnes, 1996; Thompson & Gullone, 2003; Zasloff, 1996; Zilcha-Mano, Mikulincer, & Shaver, 2011). For example, Poresky, Hendrix, Mosier, and Samuelson (1987) compared the validity of their Companion Animal Bonding Scale to the Pet Attitude Scale and found a correlation of 0.39 between the two scales. Construct validity of the questionnaires generally range from 0.27 for the Children's Treatment of Animals Questionnaire (Thompson & Gullone, 2003) to 0.87 for some items on the human-animal bond scale (Schneider, Lyons, Tetrick, & Accortt, 2010). Studies have not specifically examined criterion validity of human-animal relationship questionnaires, but for the purpose of this study, comparing

construct validity estimates to criterion validity may give an idea of what we might expect to find for criterion validity estimates.

Examining whether the relationship questionnaire in this study predicts behavioral observations of relationships can help evaluate the validity of the questionnaire. The aim of Chapter 6 was to assess the criterion validity of the questionnaire in two ways. Both ways involved using data from walk-and-talks, an evaluation given to dogs shortly before participants completed the questionnaire. First, scores from walk-and-talks rated by GEB staff were compared to scores from the questionnaire. This step tapped the knowledge of the staff members, who have observed many different human-dog relationships and are less likely to be biased than puppy raisers. Second, data collected from video recordings were coded and rated and compared to scores from the questionnaire. Video recordings consisted of a Figure-8 exercise that was given at the beginning of each walk-and-talk. This test allowed the puppy raiser-dog relationship to be evaluated in the context of a standardized exercise.

When comparing the questionnaire to behavioral observations of relationships, it is highly unlikely that the behavioral observations encompass everything captured by the relationship questionnaire. The walk-and-talk was designed to capture elements related to the puppy raiser-dog relationship, but specifically related to raiser and dog skills. Therefore, the questionnaire factors most relevant to the behavioral observations should be Obedience and Understanding of dog.

METHOD

Participants

Participants were the same set of puppy raisers and dogs described in Chapter 3. Participants were included in the validity analysis only if they agreed for researchers to examine the videos made during their walk-and-talk sessions with their dogs at 4, 8, and 13-months. In some cases, data was not examined because it was not recorded and videos were not examined because of video recording issues, which caused either the video not to record or for the file to be corrupt and not open.

Procedure

Participants went through walk-and-talks with their dogs when the dogs were approximately 4, 8, and 13-months of age. Staff at GEB conducted walk-and-talks. Staff asked participants a series of questions and to complete a series of skills during the walk-and-talk. The walk-and-talks were individualized for each participant/dog pair and typically included a conversation about how the dog was doing, skills the dog should have known by that age (e.g., come, sit, down, crate, etc.), and assessed how well the participant and dog worked together. At the end of the walk-and-talk, staff scored participants and dogs on their progress in the program. The score included 17 items related to relationship skills (see Appendix G for a description of each item).

In addition, each walk-and-talk included a standardized exercise at the beginning of the walk-and-talk called a Figure-8 exercise. In this exercise, two cones were placed approximately 10 feet away from one another. Participants were first instructed to walk around the cones in a figure-8 shape with their dog in one direction three times. Second,

participants were instructed to walk to the middle of the cones and command their dogs to sit. Third, participants were instructed to walk around the cones in a figure-8 shape in the opposite direction three times. Finally, participants were instructed to walk to the middle of the cones and command their dog to lie down. Figure-8 exercises took two to three minutes for participants and dogs to complete. The Figure-8 exercise was video taped, so that researchers could code and rate the exercise at a later time (see Appendix H for a list of variables coded and rated). Codings are discrete classifications of behavior, such as frequency and duration. Ratings are broader subjective judgments, often made through an assessment. In this study, I used both methods to obtain the most comprehensive view as possible about the puppy raiser-dog relationship.

Video codings

To determine what variables to code, I watched several example videos and came up with an initial list of variables related to the puppy raiser-dog relationship. Four research assistants (RAs) then coded dogs based on those variables. Variables and definitions were modified based on the initial codings and some variables were added based on feedback from RAs.

Videos were coded by undergraduate students at the University of Texas at Austin who worked as RAs using the coding program, Scribe 4 (Duke & Stammen, 2011). A total of seven RAs helped to code all of the dogs, but each dog was coded by only two RAs. Each RA went through a training session, which consisted of teaching the RA how to use Scribe and which variables to code. RAs were given a standardized form that defined all of the coding variables. They were also given a verbal explanation of what each coding meant. Next, they were shown a sample video and told what to look for

when coding each video. RAs were allowed to ask questions during the training session if they were unsure about what a particular variable consisted of. Finally, RAs were instructed to code six sample videos not included in the study.

Once RAs were finished coding the six sample videos, the reliability of their codings was assessed. Coding variables were compared to an aggregate of the other RA coding variables. If any of the sample coding variables had lower than a 0.70 correlation to the aggregate coding variables, RAs were given a follow up explanation of how to correctly code the variable before moving on to videos included in the study.

Video ratings

To determine what variables to rate and how to define the variables, I watched several example videos and came up with an initial list of variables and definitions of variables related to the relationship. Two RAs then rated dogs based on those variables and definitions. Variables and definitions were modified based on the initial ratings and some variables were added based on feedback from RAs.

Videos were rated by undergraduate students at the University of Texas at Austin who worked as RAs. A total of 13 RAs helped to rate all of the dogs, but each individual dog was rated by only four RAs. Each RA went through a training session, which consisted of teaching the RA what to rate from each video. RAs were given a standardized form that defined all of the rating variables. They were also given a verbal explanation of what each rating meant. Next, they were shown a sample video and told what to look for when rating each video. After watching the first video, RAs were told what ratings should be assigned to the dog in the video. RAs were allowed to ask questions during the training session if they were unsure about what a particular variable

consisted of. At the end of the training session, RAs were instructed to rate 10 sample videos not included in the study.

Once RAs were finished coding the 10 sample videos, the reliability of their ratings was assessed. Rating variables were compared to an aggregate of the other RA rating variables. If any of the sample ratings variables had lower than a 0.70 correlation to the aggregate ratings variables, RAs were given a follow up explanation of how to correctly rate the variable before moving on to videos included in the study.

Data analysis

A principal component analysis (PCA, varimax rotation) was used to examine the structure of the walk-and-talk data. To assess the sampling adequacy both Bartlett's (1950) test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy were used.

To determine the number of factors to extract from the PCA, I used a scree test, a parallel analysis, the Bass Ackwards technique, and the interpretability of the factors.

To do the parallel analysis, I used 1,000 simulated data sets that contained the same number of items and participants as the original data set. I then compared the eigenvalues from the simulated data to the eigenvalues from the original data set to determine the number of factors to extract (O'Connor, 2000).

I based the final solution on a number of factors based on the convergence across these methods as well as a solution that allowed for a simplistic, but interpretable explanation of the data.

To examine the validity of questionnaire factors, Pearson's correlations were used between the factors from the questionnaire and the walk-and-talk items, the Figure-8 codings, and the Figure-8 ratings.

To estimate the reliability of the coding and rating variables, intra-class correlation coefficients (ICCs) were used (Shrout & Fleiss, 1979).

RESULTS

Principal component analysis

4-months

At 4-months of age, Bartlett's test of sphericity was significant ($\chi^2 = 555.00$, $p < 0.001$), indicating good sampling adequacy. KMO was 0.86, above the 0.60 cut-off that suggests good sampling adequacy.

The scree plot suggested retaining 2 factors (Figure 10). The parallel analysis suggested retaining 1 factor (Figure 11). The Bass Ackwards suggested a 4-factor solution could be used (Figure 12). Based on all the criteria, a 1-factor solution was selected (Table 7). The 17 items showed good reliability (Cronbach's $\alpha = 0.92$). The items from the walk-and-talk have to do with skills puppy raisers and dogs have learned relating to communication and obedience and was thus labeled 'Relationship skills'. All items loaded strongly on the 1 factor so all 17 items were used to examine Relationship skills.

8-months

At 8-months of age, Bartlett's test of sphericity was significant ($\chi^2 = 574.47$, $p < 0.001$), indicating good sampling adequacy. KMO was 0.88, above the 0.60 cut-off that suggests good sampling adequacy.

The scree plot suggested retaining 2 factors (Figure 13). The parallel analysis suggested retaining 1 factor (Figure 14). The Bass Ackwards suggested a 2-factor solution could be used (Figure 15). Based on all the criteria, a 1-factor solution was selected (Table 8). The 17 items showed good reliability (Cronbach's $\alpha = 0.93$). The items from the walk-and-talk have to do with skills puppy raisers and dogs have learned relating to communication and obedience and was thus labeled 'Relationship skills'. All items loaded strongly on the 1 factor so all 17 items were used to examine Relationship skills.

13-months

At 13-months of age, Bartlett's test of sphericity was significant ($\chi^2 = 573.69$, $p < 0.001$), indicating good sampling adequacy. KMO was 0.84, above the 0.60 cut-off that suggests good sampling adequacy. The items from the walk-and-talk have to do with skills dogs and raisers have learned relating to communication and obedience and was thus labeled 'Relationship skills'.

The scree plot suggested retaining 2 factors (Figure 16). The parallel analysis suggested retaining 1 factor (Figure 17). The Bass Ackwards suggested a 2-factor solution could be used (Figure 18). Based on all the criteria, a 1-factor solution was selected (Table 9). The 17 items showed good reliability (Cronbach's $\alpha = 0.93$). The items from the walk-and-talk have to do with skills puppy raisers and dogs have learned

relating to communication and obedience and was thus labeled 'Relationship skills'. All items loaded strongly on the 1 factor so all 17 items were used to examine Relationship skills.

Correlations between questionnaire factors and walk-and-talk items

4-months

As discussed, Obedience and Understanding of dog should be most relevant to data obtained from the walk-and-talk. At 4-months, relationship skills significantly correlated with both Obedience-4 and Understanding-4 (Table 10). Overall criterion validity for Obedience-4 was 0.31 and items ranged from 0.05 for 'raiser gives food rewards properly' to 0.32 for 'raiser provides clear communication'. Overall criterion validity for Understanding-4 was 0.33 and items ranged from 0.08 for 'raiser allows pup time to resolve conflict' to 0.37 for 'pup settles'. Overall criterion validity for relationship skills was 0.03 for Anthropomorphism-4 and items ranged from -0.16 for 'raiser uses skills to direct' to 0.13 for 'pup at appropriate skill level'. Overall criterion validity for Closeness-4 was 0.07 and items ranged from -0.08 for 'pup taking responsibility during follow me' to 0.19 for 'pup settles'. Overall criterion validity for Care-4 was 0.18 and items ranged from -0.01 for 'pup in the green zone' to 0.24 for 'pup at appropriate skill level'.

8-months

At 8-months, relationship skills did not significantly correlate with Obedience-8 or Understanding-8 (Table 11). Overall criterion validity for Obedience-8 was 0.18 and items ranged from 0.00 for 'pup takes rewards properly' to 0.29 for 'repeated positive

experiences. Overall criterion validity for Understanding-8 was 0.14 and items ranged from -0.10 for ‘pup left alone uncared for’ to 0.24 for ‘raiser provides clear communication’. Overall criterion validity for relationship skills was 0.00 for Anthropomorphism-8 and items ranged from -0.16 for ‘raiser gives food rewards properly’ to 0.09 for ‘pup settles’. Overall criterion validity for Closeness-8 was 0.08 and items ranged from -0.03 for ‘pup left alone uncared for’ to 0.16 for ‘pup in the green zone’. Overall criterion validity for Care-8 was -0.08 and items ranged from -0.20 for ‘pup taking responsibility during follow me’ to 0.16 for ‘pup left alone uncared for’.

13-months

At 13-months, relationship skills significantly correlated with both Obedience-13 and Understanding-13 (Table 12). Overall criterion validity for Obedience-13 was 0.23 and items ranged from 0.01 for ‘pup takes rewards properly’ to 0.28 for ‘raiser provides clear communication’. Overall criterion validity for Understanding-13 was 0.37 and items ranged from 0.15 for ‘raiser allows pup time to resolve conflict’ to 0.38 for ‘pup left alone uncared for’. Overall criterion validity for the relationship skills was -0.13 for Anthropomorphism-13 and items ranged from -0.21 for ‘pup taking responsibility during follow me’ to 0.00 for ‘raiser provides clear communication’. Overall criterion validity for Closeness-13 was 0.14 and items ranged from -0.13 ‘pup checks in’ to 0.19 for ‘raiser keeps a loose leash’. Overall criterion validity for Care-13 was 0.13 and items ranged from -0.02 for ‘pup settles’ to 0.19 for both ‘pup responds to name’ and ‘raiser’s use of you’.

Reliability of codings and ratings

Most coding and rating variables showed good reliability, but some variables were lower than the 0.70 threshold sometimes proposed as a threshold for acceptable reliability (Cicchetti, 1994; but see John and Soto, 2007; Table 13). In particular, sit time at 4-months (ICC = 0.50), down time at 4-months (ICC = 0.61), distraction at 8 and 13-months (ICC = 0.31-0.66), leash tension at all ages (ICC = 0.51-0.59), commands at 4 and 8-months (ICC = 0.51-0.51), raiser focus at all three ages (ICC = 0.49 – 0.65), communication quality at all three ages (ICC = 0.33-0.44), human energy at 8 and 13-months (ICC = 0.61), raiser-dog communication at 13-months (ICC = 0.69), and relationship quality at 8 and 13-months (ICC = 0.65-0.67) were all below the 0.70 threshold.

Correlation between questionnaire factors and Figure-8 exercise

4-months

At 4-months, some items correlated with Obedience-4, but no items correlated with Understanding-4 (Table 14). For Obedience-4, average criterion validity was 0.01 and the items ranged from -0.19 for ‘leash tension’ to 0.30 for ‘dog focus’. For Understanding-4, average criterion validity was -0.01 and the items ranged from -0.16 for ‘treats’ to 0.15 for ‘communication quality’. For Anthropomorphism-4, average criterion validity was -0.03 and the items ranged from -0.14 for ‘verbal praise’ to 0.08 for ‘human energy’. For Closeness-4, average criterion validity was 0.01 and the items ranged from -0.16 for ‘dog energy’ to 0.12 for ‘dog focus’. For Care-4, average criterion validity was -0.03 and items ranged from -0.36 for ‘down time’ to 0.17 for ‘total time’.

8-months

At 8-months, no Figure-8 items correlated with Obedience-8 and one Figure-8 item correlated with Understanding-8 (Table 15). For Obedience-8, average criterion validity was 0.01 and the items ranged from -0.15 for ‘treats’ to 0.08 for ‘communication quality’. For Understanding-8, average criterion validity was 0.00 and the items ranged from -0.20 for ‘commands’ to 0.19 for ‘communication quality’. For Anthropomorphism-8, average criterion validity was 0.02 and the items ranged from -0.09 for ‘verbal praise’ to 0.18 for ‘communication quality’. For Closeness-8, average criterion validity was -0.01 and the items ranged from -0.09 for ‘sit time’ to 0.12 for ‘verbal praise’. For Care-8, average criterion validity was 0.02 and the items ranged from -0.10 for ‘raiser-dog coordination’ to 0.19 for ‘verbal praise’.

13-months

At 13-months, some Figure-8 items correlated with both Obedience-13 and Understanding-13 (Table 16). For Obedience-13, average criterion validity was -0.01 and the items ranged from -0.25 for ‘leash tension’ to 0.21 for ‘dog focus’. For Understanding-13, average criterion validity was 0.00 and the items ranged from -0.23 for ‘total time’ to 0.27 for ‘communication quality’. For Anthropomorphism-13, average criterion validity was 0.00 and the items ranged from -0.25 for ‘leash tension’ to 0.27 for ‘dog focus’. For Closeness-13, average criterion validity was -0.05 and the items ranged from -0.26 for ‘commands’ to 0.10 for ‘down time’. For Care-13, average criterion validity was -0.02 and the items ranged from -0.19 for ‘treats’ to 0.09 for ‘dog energy’.

SUMMARY

Criterion validity of the questionnaire was assessed by examining the correlation between questionnaire factors and walk-and-talk scores and Figure-8 exercises. Walk-and-talk scores assessed human and dog relationship skills and Figure-8 exercises assessed a variety of items relating to obedience and communication skills between raisers and dogs. There was evidence for good criterion validity between Obedience and Understanding of dog and relationship skills at 4-months and 13-months, but not at 8-months. There was some evidence for good criterion validity between Obedience and Figure-8 codings and ratings at 4-months and 13-months, but not at 8-months. Finally, there was some evidence for good criterion validity between Understanding of dog and Figure-8 codings and ratings at 8-months and 13-months, but not at 4-months.

CHAPTER 7: PUPPY RAISER AND DOG CHARACTERISTICS

Overview

When examining the puppy raiser-dog relationship it is also important to identify characteristics that influence the relationship. Characteristics of both humans and dogs are likely to contribute to the relationship because the relationship is a series of interactions between the two species. Understanding how characteristics of humans and dogs influence the human-dog relationship may provide information that can help people establish more positive relationships with their dogs, which is useful for working-dog purposes.

CHARACTERISTICS OF THE PUPPY RAISER

Features of the puppy raiser's personality may influence how the relationship develops. Some people probably form better relationships with their dogs than do others. For example, people who are higher on Extraversion may have more social interactions with other people than people who are lower on Extraversion and may consequently end up socializing their dog more. Some research has shown that people higher on Extraversion appreciate shared activities with their dogs more than owners who scored lower on Extraversion (Kortschal, Schöberl, Bauer, Thibaut, & Wedl, 2009). Neuroticism seems to be associated with pet attachment anxiety (worries that something bad might happen to one's pet; Zilcha-Mano, Mikulincer, & Shaver, 2011) and people who score higher on Neuroticism seem to spend more time with their dogs than do people who score lower on Neuroticism (Kortschal, Schöberl, Bauer, Thibaut, & Wedl, 2009). Other research has shown that people who are identity seekers (people who are trusting of

their intuitions and feelings) score higher on attachment to their pets than do people who are knowledge seekers (people who are skilled in strategic analysis) and people who are sensation seekers (people who have a desire to impact others; Bagley & Gonsman, 2005). Some research has also identified correlations between human personality and dog personality on all of the Big Five personality dimensions (Turcsán, Range, Virányi, Miklósi, & Kubinyi, 2012) and that dog owners report more positive attitudes toward their pets when their behavior is similar to their pet's behavior (Zeigler-Hill & Highfill, 2010). Other research has found owners of dogs with behavioral problems score lower on confidence, independence, and are less comfortable with themselves than are owners of dogs without behavioral problems (Dodman, Patronek, Dodman, Zelin, & Cottam, 2004). Finally, some research has shown that people who score higher on Openness, Agreeableness, and Conscientiousness are more strongly attached to dogs than are people who score lower on those traits (Kurdek, 2008).

Demographic characteristics may influence the human-dog relationship as well. Some research has suggested that compared with men, women are more strongly attached to their dogs (Archer & Ireland, 2011; Johnson, Garrity, & Stallones, 1992; Kafer, Lago, Wamboldt, & Harrington, 1984; Lewis, Krageloh, & Shepherd, 2009), embrace the dog companionship experience more (Dotson & Hyatt, 2008), talk to their dogs more (Prato-Previde, Fallani, & Valsecchi, 2006), and have dogs that are more obedient (Bennett & Rohlf, 2007; Kubinyi, Turcsán, & Miklósi, 2009). Marital status appears to be influential as well. Some research has shown never married, divorced, widowed, childless couples, newlyweds, and empty-nester people have higher attachment to pets than do married couples and couples that have children (Albert & Bulcroft, 1988). Other research has

shown that presence of children is negatively associated with closeness and owner-dog interaction (Dotson & Hyatt, 2008; Marinelli, Adamelli, Normando, & Bono, 2007; Meyer & Forkman, 2014). Age and education appears to be related to relationships as well. Research has shown people under 35 and with some level of college education or higher showed higher levels of relationship symbiosis than participants over 35 and with no college education (Dotson & Hyatt, 2008). Further, participants over 65 showed less anthropomorphic attitudes toward dogs than did participants younger than 65 (Dotson & Hyatt, 2008). Attachment to pets has been shown to be higher in older children and children of mothers who are employed than younger children and children of mothers who are unemployed (Melson, Peet, & Sparks, 1991). Finally, relationships appear to be related to dog experience and time people spend with their dogs. Attachment has been found to be higher in people who have had previous dog experience versus people who have not had previous dog experience (Marinelli, Adamelli, Normando, & Bono, 2007) and obedience is better for military working dogs that went home with their handlers than for military working dogs that stayed in kennels (Lefebvre, Diederich, Delcourt, & Giffroy, 2006).

CHARACTERISTICS OF THE DOG

There is much less previous research on the dog's influence on the relationship than there is research on the role of humans. However, features of the dog may also have an influence on the human-dog relationship. Some dogs probably enable humans to connect more easily with them than do other dogs. Dogs that are more agreeable may have a stronger relationship with their owner than disagreeable dogs because they are likely easier to care for and some research has shown dog Agreeableness, along with

Openness, predicts human-dog relationship satisfaction (Cavanaugh, Leonard, & Scammon, 2008). Fearfulness also appears to be important in that research has shown dog fearfulness positively predicts emotional closeness (Meyer & Forkman, 2014). Also, research has shown owners of less aggressive English Cocker Spaniels were more attached to their dogs than were owners of more aggressive English Cocker Spaniels (Podberscek & Serpell, 1997). Other research has shown dogs with high levels of energy, affection, and intelligence are more attached to owners than dogs with low levels of energy, affection, and intelligence (Kurdek, 2008). One study found that attachment was associated with dog trainability and separation problems (Hoffman, Chen, Serpell, & Jacobson, 2013). Next, dogs scoring higher on Neuroticism appear to be more prone to develop separation related disorder than dogs lower on Neuroticism (Konok, Kosztolányi, Rainer, Mutschler, Halsband, & Miklósi, 2015) and dogs scoring higher on rough and tumble play scored lower on separation related behavior than dogs scoring lower on rough and tumble play (Rooney & Bradshaw, 2003). Next, dogs receiving obedience training were more likely to obey commands than were dogs not receiving obedience training (Kobelt, Hemsworth, Barnett, & Coleman, 2003) and scored high on trainability (Kubinyi, Turcsán, & Miklósi, 2009). Also, some research suggests daily communication with dogs can help people high on Neuroticism cope with stress (Tateishi, Ohtani, & Ohta, 2014). Finally, certain breeds of dogs probably promote stronger relationships than other breeds because of the personality of the dog. Some research has shown attachment is lower in pure breed dogs than in mixed breed dogs (Marinelli, Adamelli, Normando, & Bono, 2007), but other research shows pure breed dogs score higher for relationship factors such as dog-orientated self-concept (the importance of the dog to the human's

self-concept; Dotson & Hyatt, 2008). One study found crossbred dogs were more disobedient than were purebred dogs (Bennett & Rohlf, 2007).

The aim of Chapter 7 was to examine how both characteristics of the puppy raiser and dog influence the human-dog relationship. This chapter examines the relationship between puppy raiser characteristics and relationship factors and examines the relationship between dog characteristics and relationship factors.

METHOD

Participants

Participants were the same puppy raisers and dogs described in Chapter 3 at approximately 4, 8, and 13-months of age. When taking the questionnaire, participants filled out information about themselves in addition to the relationship questionnaire. Dog information was collected by GEB as part of their standard operating procedures.

At 4-months, participants were 131 puppy raisers (120 female), with an average age of 45.05 years ($SD = 16.47$), and who had previously raised an average of 2.73 dogs ($SD = 3.23$). Dogs were mostly Labrador Retrievers (91.6%), with some German Shepherds (6.9%) and some Lab/Golden Retriever mixes (1.5%). There were slightly more male dogs (50.4%) than female dogs (48.9%) (See Table 17 for all demographics).

At 8-months, participants were 124 puppy raisers (109 female), with an average age of 48.25 years ($SD = 15.37$), and who had previously raised an average of 3.07 dogs ($SD = 3.17$). Dogs were mostly Labrador Retrievers (93.4%), with some German Shepherds (5.8%) and Lab/Golden Retriever mixes (0.8%). There were slightly more male dogs (51.7%) than female dogs (48.3%) (See Table 18 for all demographics).

At 13-months, participants were 140 puppy raisers (119 female), with an average age of 46.30 years ($SD = 16.46$), and who had previously raised an average of 2.13 dogs ($SD = 3.48$). Dogs were mostly Labrador Retrievers (92.5%) with some German Shepherds (4.5%), and Lab/Golden Retriever mixes (1.5%). There were slightly more male dogs (50.7%) than female dogs (49.3%) (See Table 19 for all demographics).

Measures

Human characteristics

Human demographic information was collected from the questionnaire, which included questions about age, gender, number of co-raisers, percentage of time handling the dog in the walk-and-talk, if the participant was planning on raising another dog, the number of previous dogs they had raised for the organization, and how they felt their relationship with their dog compared to (brother/sister, mentor/advisee, parent/child, other). Participants also filled out the Big Five Inventory (John & Srivastava, 1999), which measures the Big Five personality dimensions (Extraversion, Conscientiousness, Agreeableness, Neuroticism, and Openness to Experience; Appendix E). Responses from these questions were used to examine the relationship between participant characteristics and relationship scores.

Dog characteristics

Basic dog demographic information was collected from the questionnaire, which included the age of the dog when the participant filled out the questionnaire, sex of the dog, and the breed of the dog. Information about dog characteristics was collected in two ways. First, participants filled out the Canine Behavioral Assessment and Research

Questionnaire (C-BARQ; Hsu & Serpell, 2003) when their dogs were 6 and 12-months of age (Appendix I). The C-BARQ is an instrument that has been used frequently to understand working dogs and to predict behavior most suitable for working dogs (Duffy & Serpell, 2012). Second, staff from GEB filled out a behavioral checklist (BCL), which consists of 23 items relating to the dog's behavior (Appendix J). The BCL was scored at multiple times during the dog's life, including at 2-months, 4-months, 8-months and 13-months.

Data analysis

To compute the five personality trait scale scores from the human personality inventory, the 16 negatively keyed items were reverse scored. The aggregate personality score for each trait was generated by taking the average of the items loading on that scale (and after re-coding the reverse-keyed items). This process resulted in five scores per participant, with each score representing their standing on the five personality trait dimensions. The reliability of each scale was estimated using Cronbach's alpha, which estimates the degree to which the different items on the scale are tapping the same underlying construct (Cronbach, 1951).

To compute the 12 scale scores from the C-BARQ, the three negatively keyed items were reverse scored. The aggregate score for each dimension was generated by taking the average of the items loading on that scale (and after re-coding the reverse-keyed items). This process resulted in 12 scores per participant, with each score representing their standing on the 12 C-BARQ dimensions. The reliability of each scale was estimated using Cronbach's alpha (Cronbach, 1951).

To compute the 4 scale scores from the BCL, an aggregated score for each dimension was generated by taking the average of the items loading that scale. This process resulted in 4 scores per participant, one each to represent their standing on each of the 4 BCL dimensions. The reliability of each scale was estimated using Cronbach's alpha (Cronbach, 1951).

To examine the influence of human characteristics on relationship factors, I used a series of multiple linear regressions. Relationship factors were used as dependent variables and human characteristics were used as independent variables. Models included the age of the participant, the number of dogs they previous raised for the organization, and their 5 personality dimensions (Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness). Participant gender was not used since a majority of participants were female.

To examine the influence of dog CBARQ dimensions on relationship factors, I used a series of multiple linear regressions. Relationship factors were used as dependent variables and dog characteristics were used as independent variables. Models included 12 CBARQ traits (stranger-directed aggression, owner-directed aggression, familiar-dog aggression, trainability, chasing, stranger-directed fear, nonsocial fear, separation related problems, pain sensitivity, excitability, and attachment) when dogs were both 6 and 12-months.

To examine the influence of dog BCL dimensions on relationship factors, I used a series of multiple linear regressions. Relationship factors were used as dependent variables and dog characteristics were used as independent variables. Models included 4 BCL dimensions (calmness/composure, focus, environmental soundness, body

sensitivity) and two single items from the BCL (comparison rating and consistency). At each age, models were conducted for 2-month ‘puppy test’ BCL scores and the BCL from the age of the dog (4-months at 4-months, 8-months at 8-months, and 13-months at 13-months).

RESULTS

4-months

Human characteristics

As shown in Table 20. Anthropomorphism-4 scores were predicted by Agreeableness (standardized $\beta = 0.20$), Neuroticism (standardized $\beta = 0.23$) and participant age (standardized $\beta = -0.39$). Obedience-4 scores were predicted by Conscientiousness (standardized $\beta = 0.28$), Neuroticism (standardized $\beta = -0.20$), participant age (standardized $\beta = -0.30$), and the previous number of dogs raised (standardized $\beta = 0.40$). Closeness-4 scores were predicted by Openness (standardized $\beta = 0.24$). Scores on Understanding-4 were predicted by Neuroticism (standardized $\beta = -0.40$) and age (standardized $\beta = 0.38$) and Care-4 scores were predicted by Conscientiousness (standardized $\beta = 0.27$).

Dog characteristics from the CBARQ at 6 and 12-months

As shown in Table 21, Anthropomorphism-4 scores were predicted by attachment (standardized $\beta = 0.26$) at 6-months, but no dog characteristics predicted Anthropomorphism-4 scores at 12-months. Obedience-4 scores were predicted by trainability (standardized $\beta = 0.32$) at 6-months, but no dog characteristics predicted Obedience-4 scores at 12-months. Closeness-4 scores were predicted by attachment

(standardized $\beta = 0.29$) at 6-months and owner-directed aggression (standardized $\beta = -0.70$) and attachment (standardized $\beta = 0.29$) at 12-months. Understanding-4 scores were predicted by attachment (standardized $\beta = -0.28$) at 6-months, but no dog characteristics predicted Understanding-4 scores at 12-months. Care-4 scores were predicted by trainability (standardized $\beta = 0.23$) and chasing (standardized $\beta = 0.26$) at 6-months and stranger-directed aggression (standardized $\beta = 0.69$) and stranger-directed fear (standardized $\beta = 0.74$) at 12-months.

Dog characteristics from BCL at the 2-month and 4-month evaluation

As shown in Table 22, Anthropomorphism-4, Obedience-4, Closeness-4, and Understanding-4 scores were not predicted by dog characteristics at 2 or 4-months. Care-4 scores were not predicted by dog characteristics at 2-months, but at 4-months environmental soundness (standardized $\beta = -0.22$) predicted Care-4 scores.

8-months

Human characteristics

As shown in Table 23, Anthropomorphism-8 scores were predicted by Extraversion (standardized $\beta = 0.28$). Obedience-8 scores were predicted by Conscientiousness (standardized $\beta = 0.22$). Closeness-8 scores were predicted by participant age (standardized $\beta = 0.28$). Understanding-8 was predicted by number of previous dogs raised (standardized $\beta = 0.21$). Care-8 was predicted by Openness (standardized $\beta = 0.28$).

Dog characteristics from the CBARQ at 6 and 12-months

As shown in Table 24, Anthropomorphism-8 scores were predicted by dog-directed aggression (standardized $\beta = -0.33$) and attachment (standardized $\beta = 0.27$) at 6-

months and owner-directed aggression (standardized $\beta = -0.32$) at 12-months. Obedience-8 scores were predicted by nonsocial fear (standardized $\beta = -0.28$) at 6-months and trainability (standardized $\beta = 0.33$) at 12-months. Closeness-8 scores were predicted by trainability at 6-months (standardized $\beta = 0.25$) and stranger-directed aggression at 12-months (standardized $\beta = 0.45$). Understanding-8 scores were predicted by attachment at 6-months (standardized $\beta = -0.43$) and by owner-directed aggression (standardized $\beta = -0.38$) and attachment (standardized $\beta = 0.41$) at 12-months. Care-8 scores were not predicted by dog characteristics at 6-months, but were predicted by separation related problems (standardized $\beta = 0.35$) at 12-months.

Dog characteristics from the BCL at 2-months and 8-months

As shown in Table 25, Anthropomorphism-8 scores were predicted by environmental soundness (standardized $\beta = 0.29$) at 2-months, but not at 8-months. No dog characteristics predicted Obedience-8 at 2 or 8-months. No dog characteristics predicted Closeness-8 scores at 2-months, but comparison rating (standardized $\beta = -0.32$) predicted Closeness-8 scores at 8-months. No dog characteristics predicted Understanding-8 scores at 2-months, but Calmness/Composure (standardized $\beta = 0.24$) predicted Understanding-8 scores at 8-months. No dog characteristics predicted Care-8 scores at 2-months, but focus (standardized $\beta = -0.33$) predicted Care-8 scores at 8-months.

13-months

Human characteristics

As shown in Table 26, Anthropomorphism-13 scores were predicted by Extraversion (standardized $\beta = 0.25$) and Conscientiousness (standardized $\beta = 0.21$).

Obedience-13 scores were predicted by participant age (standardized $\beta = -0.25$). No human characteristics predicted Closeness-13, Understanding-13, or Care-13 scores.

Dog characteristics from the CBARQ at 6 and 12-months

As shown in Table 27, Anthropomorphism-13 scores were not predicted by any of the dog characteristics. Obedience-13 scores were predicted by trainability (standardized $\beta = 0.37$) at 6-months, but no dog characteristics predicted Obedience-13 scores at 12-months. Closeness-13 scores were predicted by trainability (standardized $\beta = 0.33$) at 6-months, but no dog characteristics predicted Closeness-13 scores at 12-months.

Understanding-13 scores were predicted by separation related problems at 6-months (standardized $\beta = -0.25$), but no dog characteristics predicted Understanding-13 at 12-months. Care-13 scores were predicted by dog-directed aggression (standardized $\beta = -0.26$) and chasing (standardized $\beta = 0.29$) at 6-months and by separation related problems (standardized $\beta = -0.25$) and excitability (standardized $\beta = -0.28$) at 12-months.

Dog characteristics from the BCL at the puppy test and 13-months

As shown in Table 28, Anthropomorphism-13 scores were predicted by environmental soundness (standardized $\beta = 0.23$) at 2-months, but no BCL traits predicted Anthropomorphism-13 at 13-months. No Obedience-13 or Care of dog scores were predicted by BCL traits at 2 or 13-months. No BCL traits predicted Closeness-13 scores at 2-months, but environmental soundness (standardized $\beta = 0.16$) predicted Closeness-13 at 13-months. No BCL traits predicted Understanding-13 at 2-months, but body sensitivity (standardized $\beta = 0.19$) and consistency (standardized $\beta = -0.21$) predicted Understanding-13 at 13-months.

SUMMARY

The influence of both human and dog characteristics on relationship factors was examined when dogs were 4, 8, and 13-months of age. Some characteristics predicted relationship factors better than others (see Table 29 for a summary of findings).

Anthropomorphism was predicted by participant Agreeableness (4-months), Neuroticism (4-months), age (4-months), Extraversion (8-month and 13-month), and Conscientiousness (8-month and 13-month) and dog attachment (4-month and 8-month), owner-directed aggression (8-month), dog-directed aggression (8-month) and environmental soundness (8-month and 13-month).

Obedience was predicted by participant Conscientiousness (4-month and 8-month), Neuroticism (4-month), age (4-month and 13-month) and previous dog raising experience (4-month) and dog trainability (4-month, 8-month, and 13-month) and nonsocial fear (8-month).

Closeness was predicted by participant Openness (4-month) and age (8-month) and dog owner-directed aggression (4-month), attachment (4-month), stranger-directed aggression (8-month), trainability (8-month and 13-month), comparison rating (8-month), and environmental soundness (13-month).

Understanding of dog was predicted by participant Neuroticism (4-month), age (4-month) and previous puppy raising experience (4-month and 8-month) and dog attachment (4-month and 8-month), owner-directed aggression (8-month), calmness/composure (8-month), separation related problems (13-month), body sensitivity (13-month) and consistency (13-month).

Care of dog was predicted by participant Conscientiousness (4-month) and Openness (8-month) and dog stranger-directed aggression (4-month), trainability (4-month), chasing (4-month), stranger-directed fear (4-month), environmental soundness (4-month), separation related problems (8-month and 13-month), focus (8-month), dog-directed aggression (13-month), and chasing (13-month).

CHAPTER 8: GENERAL DISCUSSION

In this dissertation, I empirically explored the relationship between puppy raisers and guide dogs in training. First, I designed and piloted a questionnaire with a group of staff and puppy raisers from GEB. The questionnaire was modified based on the results from the pilot study. Next, I conducted a PCA to examine the structure of the puppy raiser-dog relationship, which resulted in 5 factors: Anthropomorphism, Obedience, Closeness, Understanding of dog, and Care of dog. The items representing these factors changed based on the age of the dog. Next, I examined the generalizability of the questionnaire across testing occasions by observing the consistency of the relationship factors between 4-months and 8-months and between 8-months and 13-months. I also examined the generalizability of the questionnaire across self and other perspectives by observing how up to three informants rated the participant on the relationship factors. There was good evidence for generalizability across testing occasions for most factors, but not as good evidence for generalizability across self and other perspectives. Next, I examined criterion validity of the questionnaire by comparing scores from the questionnaire factors to the walk-and-talk data and Figure-8 codings and ratings. I found evidence that the criterion measure of relationship skills matched some, but not all questionnaire factors. Finally, I conducted regressions to assess how different human and dog characteristics predicted relationship factors. Some human and dog characteristics predicted the relationship factors better than others. I next discuss my findings within the broader context of past research.

Factors Relating to Puppy Raiser-Dog Relationships

In Chapter 3, I examined the structure of the puppy raiser-dog relationship by performing a PCA. From the PCA, I was able to identify five factors related to the puppy raiser-dog relationship: Anthropomorphism, Obedience, Closeness, Understanding of dog, and Care of dog. The factors were composed of slightly different items at each age.

The first factor, Anthropomorphism, captures the degree to which the puppy raiser attributes human characteristics to the dog such as treating the dog like a person, talking to the dog like a person, and feeling like the dog understands the raiser's feelings. Anthropomorphism appears to be mostly related to the puppy raiser, more so than the dog. Items loading strongly on this factor relate to the raiser's attitudes towards the dog and how much the raiser feels like they can confide in their dog. The Anthropomorphism factor is similar to one found in a previous study of owner and pet dog relationships (Dotson & Hyatt, 2008). It is somewhat surprising that an Anthropomorphism factor emerges in the puppy raiser-dog relationship because of the short-term nature of the relationship. Puppy raisers know the dogs they are raising are not theirs to keep, yet a factor emerged capturing variation in the degree to which raisers feel like they can confide in their dog. These results suggest that even in these short-term relationships, some people feel like they can confide in their dog and treat their dog like a person. The definition of Anthropomorphism remains similar across all three ages.

The second factor, Obedience, captures the dog's perceived responsiveness to commands, obedience, and attentiveness to the raiser. One previous study examining human-dog relationships also found that basic and advanced skills were a part of the relationship (Walton & McConocha, 1996), but most human-dog relationship studies

have not focused on obedience. Basic obedience skills, along with socialization, is a large part of what puppy raisers do with their GEB dogs, so an Obedience factor is highly relevant to the puppy raiser-dog relationship. These results suggest Obedience and training is an important aspect of the puppy raiser-dog relationship. The items that represent Obedience-8 are slightly different from the items that represent Obedience-4 and Obedience-13. Obedience-4 and Obedience-13 are strictly about specific obedience skills, whereas Obedience-8 also includes items relating to the raiser spending time with the dog.

The third factor, Closeness, captures the degree to which the participant feels close to the dog, both physically (e.g., being near the dog) and emotionally (e.g., bonding with the dog). Several previous studies have found similar factors (Archer & Ireland, 2011; Dwyer, Bennett, & Coleman, 2006; Schneider, Lyons, Tetrick, & Accortt, 2010). Puppy raisers raise dogs for only a short period of time, so it is possible that puppy raisers would not form a relationship with their dog. These results point to at least some variation in the closeness the raisers feel to the dogs, even when they do not expect to form long-lasting relationships with them. Closeness is the factor that changes the most at each age. Closeness-8 includes many items possibly relating to Anthropomorphism such as the raiser confiding and talking with the dog, whereas Closeness-4 and Closeness-13 are both about feeling bonded and close to the dog.

The fourth factor, Understanding of dog, captures the raiser's perceived ability to understand and train their dog properly. Previous studies have not identified a factor relating to an owner's ability to understand their dog, but some studies have found aspects relating to understanding of the dog to be important such as communication and

trust (Kuhl, 2011). Understanding one's guide dog in training is an especially important goal for puppy raisers because raisers are expected to train dogs. It is likely to be easier to train a dog if one has some knowledge and understanding of the dog. These results suggest Understanding of dog is an important aspect of the puppy raiser-dog relationship. The definition of Understanding of dog remains similar across all three ages.

The fifth factor, Care of dog, captures the degree to which the raiser takes care of the dog in various ways (e.g., feeding the dog, spending time with the dog, etc.). Previous research has found care is important in human-dog relationships (Archer & Ireland, 2011; Davis, 1987; Dwyer, Bennett, & Coleman, 2006). In any relationship with another animal, care is likely important but care in puppy raiser-dog relationships may be different because things such as the costs and values of animals and making specialty purchases are probably not as important as because the program pays for many expenses relating to the dog's care (Dotson & Hyatt, 2008; Dwyer, Bennett, & Coleman, 2006; Poresky, Hendrix, Mosier, & Samuelson, 1988). The definition of Care of dog changes slightly at each age. Items defining Care-8 and Care-13 mostly refer to the ways in which the raiser takes care of and provides for the dog, while Care-4 includes some items that appear to be more directly related to being close to the dog, training the dog, and giving the dog commands.

Several of the factors including Closeness-4, Understanding-4, Care-4, Obedience-8, Closeness-8, Understanding-8, Care-8, Closeness-13, and Understanding-13 had alphas lower than 0.70, which is a threshold widely considered acceptable (Nunnally, 1978). Low internal consistency can reflect a semantically diffuse set of items (i.e., items reflecting a variety of different concepts). Factors with low internal

consistency tend to result in greater measurement error, which may result in lower validity estimates. However, analyses indicate no relationship between alpha and validity estimates ($r = 0.04$), so in this case it does not appear validity is influenced by low internal consistency.

Generalizability of the Questionnaire

GENERALIZABILITY ACROSS TESTING OCCASIONS

To examine generalizability across testing occasions, puppy raisers completed the questionnaire when their dogs were 4-months and 8-months and when their dogs were 8-months and 13-months. At both time points, generalizability of testing occasions was comparable to previous research examining test-retest reliability of dog attachment (e.g., Zilcha-Mano, Mikulincer, & Shaver, 2011) for all factors, but Closeness, which showed no generalizability across testing occasions.

Closeness may not show consistency because Closeness-4 is not the same thing as Closeness-8 or Closeness-13. The factors were given the same name because they appear to consist of the same general concept, but there is low congruence between the factors (0.64 between 4-months and 8-months and 0.13 between 8-months and 13-months). Closeness-8 appears to involve activities like confiding in the dog and talking with the dog, whereas Closeness-4 and Closeness-13 appears to involve feelings of being bonded with the dog and being close to the dog. The differences in the definitions of Closeness at each age do appear to be a major reason why generalizability is low across testing occasion. When using Closeness-4 at 8-months and comparing the factors, generalizability between 4-months and 8-months increases to 0.80. In addition, when

using Closeness-4 at 8-months and 13-months, generalizability between 8-months and 13-months increases to 0.81. The low generalizability appears to be mostly a result of Closeness being composed of different items at each age. 8-month Closeness may be capturing a different type of Closeness as 4-month and 13-month Closeness.

Other factors showed better generalizability across measurement occasion. Both Obedience and Understanding of dog relate to the raiser and dog learning skills. It is likely that all raisers and dogs learn skills at a similar rate because there is evidence for good consistency. These results suggest the most obedient dog at 4-months is likely also the most obedient dog at 8-months, even though all dogs might show mean-level changes (presumably increases) in obedience. Anthropomorphism and Care of dog may be expected to be generalizable across occasion because they relate to more of a general attitude raisers have about dogs. Anthropomorphism relates to how much a raiser confides in their dog, while Care of dog relates to how much a raiser takes care of their dog. Previous research has shown good evidence for generalizability across testing occasion based on people's attitudes toward dogs (Munstell, Canfield, Templer, Tangan, & Arikawa, 2004). These findings provide evidence that the questionnaire shows good generalizability across occasion for most of the factors.

GENERALIZABILITY ACROSS SELF AND OTHER PERSPECTIVES

To examine generalizability across self and other perspectives, informants completed the questionnaire when dogs were 4-months, 8-months, and 13-months. At all three times points, generalizability across self and others was low in comparison to similar studies of dog personality (Jones & Gosling, 2005; Fratkin, Sinn, Thomas,

Hilliard, Olson, & Gosling, 2015; Sinn, Gosling, & Hilliard, 2010; Valsecchi, Barnard, Stefanini, & Normando, 2011).

One potential reason generalizability across the self and other perspective may be low could be because informants may not have spent enough time getting to know puppy raisers and dogs. Most informants knew the dogs less than a year and many did not know the dogs for more than two months. The length of time a person knows another influences agreement (e.g., Funder & Colvin, 1988). However, if the length of time a person knew the raiser and dog was the only potential reason for low self-other agreement, then it would be expected that self-other agreement would increase with age of the dog, but self-other agreement did not increase with age in this study.

Another reason self-other agreement may be low could be because rating another's relationship is complicated. Most other research has focused on agreement about a single entity, either a person or a dog, but in this case the rating is of a person and a dog. For an informant to form an impression about a puppy raiser-dog relationship, the informant must observe both the raiser and the dog interacting with one another or at least hear about interactions between the raiser and dog. Some research has shown evidence for good self-other agreement in romantic partner attachment styles (Uziel, 2012), but in that case both informants are actually in the same relationship. It may be more difficult to assess in puppy raiser-dog relationships, where a dog is involved, instead of another human.

Some items from the questionnaire may have been highly evaluative (socially desirable), and highly evaluative items tend to be judged less accurately than other items because people either hide these traits or exaggerate them (Funder, 1995). For example,

Understanding of dog-4 showed the lowest self-other agreement and Obedience-8 showed the lowest self-other agreement. Several items loading on these factors are ones that a person may want to hide (e.g., ‘My dog chews on things he/she is not supposed to chew on’) or exaggerate (e.g., ‘My dog always pays attention to me and obeys me right away’). Informants may receive at least some of their information about puppy raiser-dog relationships from the way in which raisers speak about their relationship with their dog. Raisers may either hide or exaggerate some items relating to their relationship with their dog to be perceived by others as competent.

Self-other agreement coefficients could be used as criterion for reducing the number of items included on this questionnaire. Items with low self-other agreement may appear to be good candidates for elimination. However, many of the items may have low self-other agreement because the informants were not well placed to rate the items accurately. Past research suggests that for some kinds of items the self is a better judge but for other items informants are better judges (Vazire, 2010). For example, one of the items with low self-other agreement is ‘I enjoy it when my dog sits close to me’. This item focuses on the participant’s own feelings, which may not be easily judged by the informants. Based on these issues, items were not eliminated on the basis of low self-other agreement.

Overall, self-other agreement was low in comparison to other similar types of studies. More research is needed to examine what can be done to improve self-other agreement in these types of studies. Some factors did show evidence for good self-other agreement at some time points (0.61 for Anthropomorphism-4 and Closeness-4) so some factors do show evidence for good generalizable across self and other perspectives.

Criterion Validity of the Questionnaire

To examine criterion validity, relationship factors were compared to data collected from behavioral observations from the walk-and-talk. At two time points, there was evidence for good criterion validity for the two factors that should have related to the criterion, Obedience and Understanding of dog. In particular, at 4-months and 13-months the relationship skills criterion from the walk-and-talk significantly correlated with Obedience and Understanding of dog. Several items from the Figure-8 exercise also correlated with Obedience and Understanding of dog at 4-months and 13-months.

The walk-and-talk relationship skills criterion measures how well the dog obeys the participant and how well the participant and dog communicate with one another, which is very similar to what Obedience and Understanding of dog examine. The Figure-8 exercise also consisted mostly of skills relating to Obedience and Understanding of dog. These results suggest rater ratings of Obedience and Understanding of dogs are similar to behavioral observations of Obedience and Understanding of dogs at similar rates compared to other studies examining construct validity of human-dog relationship questionnaires (e.g., Thompson & Gullone, 2003).

At 8-months the relationship skills criterion and many of the Figure-8 items are not significantly related to Obedience-8 or Understanding-8. It could be that participants are unaware of the changes in their relationship with their dog around 8-months, but GEB staff can detect these changes. Around 8-months dogs are bigger and more difficult to manage than when they are at 4-months and some research has suggested juvenile dogs (between seven months to two years) tend to have more behavioral problems such as excessive activity and fearfulness than do puppies (Wells & Hepper, 2000). However, it

is unknown if these behavioral problem differences are because of actual differences or aspects such as the fact that juvenile dogs are more difficult to control than puppies. The size of the dog and behavioral issues may make it more difficult for some puppy raisers to train their dogs around 8-months, but they may be unaware of these changes and staff may be able to recognize the changes better than puppy raisers. Differences at 8-months may also be due to the fact the dogs reach sexual maturity around 6-months and there may be hormonal changes that influence the dog's behavioral around this age (Lindsay, 2001). These changes may influence the dog's behavior and may make it more difficult for puppy raisers to assess their relationship with their dog around this age. Further, self-other agreement for Obedience is also low at 8-months, which could suggest informants may detect differences in the puppy raiser-dog relationship, but raisers may not be able to.

Another possible explanation for why there may be no correlation between Obedience and relationship skills at 8-months could be based on the items that represent Obedience at 8-months. Many items that load onto Obedience at 8-months are related to obedience skills, but some items are also related to the raiser spending time with the dog. Items that load onto Obedience at 4-months and 13-months are mostly all related to specific obedience skills. The extra items loading onto Obedience at 8-months may make the factor less related to relationship skills at 8-months than relationship skills at 4-months or 13-months.

There was evidence for several significant correlations between Obedience and Understanding of dog at 4 and 13-months. When considering the correlations that remain significant after using Bonferroni corrections, the findings suggest no evidence for

criterion validity at 8-months and only some evidence for criterion validity at 4 and 13-months. Further research is needed to examine the criterion validity of the questionnaire factors, with a focus on replicating the effects reported here.

Human and Dog Influences on Relationships

In Chapter 8, I examined how human and dog characteristics influenced the human-dog relationship by using human and dog characteristics to predict relationship factors. Human characteristics accounted for a good percentage of the variability in all of the relationship factors, while dog characteristics accounted for more variability in Obedience and Understanding of dog than in the other factors. Some of these results are similar to previous research findings, while several findings have not been previously reported.

HUMAN CHARACTERISTICS

4-months

At 4-months, human characteristics accounted for between 16-29% of the variance in relationship factor scores. Conscientiousness positively predicted Obedience-4 and Neuroticism negatively predicted Understanding-4. Previous research has shown Conscientiousness positively related to a dog's performance on a basic task where owners lead the dog over a wire mesh bridge (Kotrschal, Schöberl, Bauer, Thibaut, & Wedl, 2009) and high Neuroticism related to owners giving dogs more commands than owners lower in Neuroticism (Kis, Turcsán, Miklósi, & Gácsi, 2012). The more verbal information a dog receives (besides the command) often leads to lower obedience (Braem

& Mills, 2010), so it is possible that raisers high in Neuroticism give dogs lots of verbal information, which results in the dog being less obedient. Results from this study do also suggest a significant correlation between communication level from the Figure-8 exercise and Neuroticism ($r = 0.20$, $p = 0.04$), so there is some evidence for Neuroticism relating to verbal information.

The age of the participant negatively predicted Anthropomorphism-4, which supports previous research (Dotson & Hyatt, 2008). Older people may already have social connections with people they feel they can confide in and may have already gone through life experiences such as having children and even having other pets. Younger people may not have gone through these experiences, which may make them more likely to confide in their dogs than in older people. One study found owners living with no children reported higher levels of social support received from their pet than did owners living with children (Paul, Moore, McAinsh, Symonds, McCune, & Bradshaw, 2014). The number of dogs a raiser previously raised for the organization significantly predicted Obedience-4 and Understanding-4. Previous research has found dogs of inexperienced owners have more prevalence of aggression than owners who have owned dogs before (Jagoe & Serpell, 1996). The more dogs a puppy raiser trains, the more they likely know what to expect from the dog and how to raise a dog without problematic behavior.

8-months

At 8-months, human characteristics accounted for between 11-17% of the variance in relationship factor scores. Extraversion positively predicted Anthropomorphism-8. Previous research has not examined the relationship between Extraversion and Anthropomorphism, but some research has found dog owners that feel

like they do not have much social support were more likely to have high levels of anthropomorphic attitudes (Antonacopoulous & Pychyl, 2008). Extraverts tend to have better social support systems do than introverts (Swickert, Hittner, & Foster, 2010), so it would be more likely that Extraversion would negatively predict Anthropomorphism. More research is needed to better understand why Extraversion positively predicts Anthropomorphism. Next, Openness positively predicted Care-8. Openness typically relates to many things associated with care in people such as being active in decision making related to healthcare (Flynn & Smith, 2007), and using healthcare facilities more (Friedman, Veazie, Chapman, Manning, & Duberstein, 2013), so it is not surprising that these traits relate to care in dogs as well.

13-months

At 13-months, human characteristics accounted for between 2-16% of the variance in relationship factor scores. At 13-months Extraversion positively predicted Anthropomorphism-13, similar to findings at 8-months. At 13-months participant age negatively predicted Obedience-13, just as it did at 4-months. These results provide further evidence that several human characteristics predict relationship factors and that some human characteristics predict some relationship factors, but not others.

DOG CHARACTERISTICS

4-months

At 4-months dog characteristics accounted for between 2-48% of the variance in relationship factor scores. Trainability positively predicted Obedience-4. Trainability directly relates to obedience and many of the trainability items match obedience items

(e.g., ‘obeys the stay command’ from the C-BARQ and ‘my dog does not stay on command’ from the questionnaire), so the more trainable a dog is, the higher the Obedience score should be. Stranger-directed fear also positively predicted Care-4. No research has examined the relationship between Care of dog and stranger-directed fear, but it could be argued that more fearful dogs require more care from their owners than less fearful dogs.

8-months

At 8-months dog characteristics accounted for between 5-33% of the variance in relationship factor scores. Stranger-directed aggression positively predicted Closeness-8 scores. Research has found a negative relationship between aggression and attachment (Podberscek & Serpell, 1997), so these results are somewhat surprising. One study found owner-directed aggression and stranger-directed aggression were influenced by different intrinsic and environmental variables (Hsu & Sun, 2010), so it possible some types of aggression may promote a feeling of Closeness, while other types of aggression may not. Attachment negatively predicted Understanding of dog. The number of previous dogs a raiser raised also predicted Understanding-8. It is possible that raisers with lots of puppy-raising experience have gone through the process of raising dogs several times and have learned to prepare themselves psychologically for the time when they must give up their dog. One way of preparing themselves could be to not allow themselves to become attached to the dog. Experienced raisers may have a good understanding of their dog but they may be more focused on raising their dog than feeling an attachment to it. Results suggest at 8-months there is a significant negative correlation between the number of previous dogs raised and attachment ($r = -0.24, p = 0.01$), which support this idea.

13-months

At 13-months dog characteristics accounted for between 1-23% of the variance in relationship factor scores. Trainability positively predicted Obedience-13, providing further evidence that trainability relates to Obedience. Chasing and excitability positively predicted Care-13. Both chasing and excitability are likely behaviors that are not desirable for guide dogs. It could be that dogs exhibiting these behaviors are difficult to train. Instead of focusing in their dog's training, raisers may focus on just making sure they can care for their dog. No research has examined the relationship between dog behavioral problems and care of dog, so more research is needed on this topic to better understand these issues.

SUMMARY OF HUMAN AND DOG CHARACTERISTICS

Both human and dog characteristics influenced relationship scores, giving evidence that the puppy raiser-dog relationship consists of characteristics from both species. Human characteristics influenced all of the relationship factors, while dog characteristics influenced Obedience and Understanding of dog more than other factors did. Both human and dog characteristics influenced relationship factors, but the variance accounted for by human and dog characteristics was relatively low in several cases (with a range between 1-48%). Other factors (e.g., the household demographics, the number of primary raisers, genetics, etc.) are also likely to be at play so future research should examine the role of such characteristics in the puppy raiser-dog relationship.

IMPLICATIONS OF THE FINDINGS

These results are of particular importance to working-dog organizations. First, this research allows working-dog organizations to examine relationships between puppy raisers and guide dogs in training in a relatively easy way using a questionnaire. Also, results suggest most of the relationship factors showed good generalizability across testing occasion, even when relationships were relatively new, around 4-months. In contrast, personality in the dogs tends to be somewhat inconsistent around that age, so it may be useful to also examine puppy raiser-dog relationships early on. Results also suggest that other people are somewhat good at rating the puppy raiser-dog relationship and others may provide useful information about the puppy raiser-dog relationship that the puppy raiser may not have insight into. For example, someone that knows the puppy raiser and dog may be able to have a more accurate sense of how well the dog responds to the raiser.

Next, these results help to clarify what is already being assessed by GEB through the walk-and-talks. Staff assess 17 items from the walk-and-talks, and all of those items loaded onto a single factor assessing relationship skills. These findings suggest it may be possible to reduce the number of items asked because they all seem to be tapping a similar underlying factor. Relationship skills related to Obedience and Understanding of dog at 4 and 13-months. It could be beneficial to examine other aspects of the relationship during the walk-and-talk such as those relating to Anthropomorphism, Closeness, and Care of dog.

These results can also help working-dog organizations direct their resources to improving elements of the relationship likely to be beneficial to program success. For

example, it is likely that Obedience and Understanding of dog are factors for which puppy raisers and dogs should get high scores. By obtaining measures of these factors early on, working-dog organizations can provide additional training to increase obedience and to help the puppy raisers better understand their dogs. These results also help us to understand how both the raiser and the dog influence the relationship factors, which can help working-dog organizations better understand when relationships may be successful and when they may be unsuccessful. For example, at 4-months a highly obedient relationship will likely consist of a raiser who is young, with high Conscientiousness, low Neuroticism, and previous dog-raising experience and a dog high on trainability. These results are beneficial in better understanding how both puppy raisers and dogs influence successful or unsuccessful relationships.

These results may also be informative for understanding other types of relationships, such as those between parents and children. The trajectory of the relationship between humans and dogs likely unfolds more quickly than the relationship between humans and other humans because dogs develop at a more rapid rate and have shorter life spans than humans do. These results may be especially useful for understanding relationships between parents and foster children because both are short-term relationships. Further, comparing people's relationships with dogs relate to their relationships with other people may provide new insights into understanding relationship processes more generally.

Limitations and Future Directions

There are several potential limitations of this study. First, the study was not completely longitudinal. There was some overlap of participants across testing occasions,

but many participants were surveyed at only one time point. Thus, observed differences (e.g., in the structure of the questionnaire) could be due to participant differences, rather than changes over time. It is also important to note is that even though Ilar gave the five relationship factors the same name at each age, they did not consist of the same items. Some factors showed evidence for good congruence between ages (e.g., the congruence coefficient for Care of dog between 8 and 13-months was 0.98), but many factors did not (e.g., the congruence coefficient between Closeness at 4 and 8-months was 0.64). The same name was used at each age because the factor seemed to be composed of items relating to that name. For example, many of the items loading on Closeness were different between 4-months and 8-months, but altogether the items at both time points appeared to relate to a type of closeness between the raiser and dog. Making comparisons across ages is complex in this case because there are differences in the variable being examined. Closeness at 4-months and Closeness at 8-months are somewhat different, so aspects such as human and dog characteristics that influence those factors may be different at each age because the factor is somewhat different.

A further limitation is that some differences in factor definitions may be driven by differences between participants (human and dog) in the different samples rather than differences between relationships at different ages of the dogs. The participants' demographic data (Tables 7.1-7.3) are similar across ages but there could be other differences between the samples causing differences in results. For example, participants at 4-months could be in a geographically different area than participants at 8-months and thus have different staff helping them with their dog.

Also, it is important to note that Closeness is not as psychometrically sound (reliable or valid) as the other factors. Thus, more research is needed to understand the factors driving the low reliabilities found here and whether they can be improved. More generally, research is needed to determine whether Closeness remains an important factor in the puppy raiser-dog relationship.

Another limitation is that the study was done mostly from the raiser's perspective and not the dog's perspective. The raiser filled out the relationship questionnaire and the C-BARQ. Staff filled out the walk-and-talk report and BCL and research assistants coded and rated the Figure-8 exercise. Multiple sources were used to help understand the puppy raiser-dog relationship as thoroughly as possible, but the data collected from this study was either made by the raiser or by someone else that examined the raiser's relationship with their dog. Future research is needed to better understand the dog's perspective of the relationship by examining dog aspects such as examining hormones and/or by creating a behavioral assessment that makes the dog's perspective obvious in the assessment.

In addition, KMO from the PCA of the questionnaire was below the criteria generally considered suitable for factor analysis at each of the ages, which suggests the data was not suitable for factor analysis. It is likely that KMO was low because there was not a good item to participant ratio. There were 100 items on the questionnaire and 124-140 participants at each age. Research usually suggest at least 5 participants per item and a sample size of at least 200 when conducting a PCA, which would suggest at least 500 participants in this study (Gorsuch, 1983). Obtaining large numbers of participants for working-dog studies is often difficult because there are only a limited number of potential people that raise working-dogs, so reducing the number of items from the questionnaire

may be beneficial in future studies. Future research should examine the structure of the questionnaire with more participants and fewer items.

Another potential limitation is that the reliability of the walk and talk data is unknown. Walk-and-talks were rated by 16 different GEB staff members. Staff have gone through several iterations of the walk-and-talk form used to rate dogs and the current form was developed for use for this study. Staff may have unintentionally been using previous walk-and-talk forms or they may not have understood the differences. Low reliability may have caused the criterion validity of the study to be lower than it should have been. Future research is needed to examine the inter-observer reliability of staff walk-and-talk ratings.

Next, criterion validity was only relevant for two factors from the questionnaire (Obedience and Understanding of dog). Anthropomorphism, Closeness, and Care of dog do not appear to relate to items scored from the walk-and-talk or Figure-8, so it is difficult to know if the questionnaire is or is not tapping at some behavioral measure of these traits. The assessment used to estimate criterion validity for Obedience and Understanding of dog also was not specifically designed to measure Obedience and Understanding of dog; instead it was an assessment the organization already used. Behavioral tools need to be created to better permit stronger tests of the criterion validity of all the factors.

Also, walk-and-talks were given to participants right before they filled out the questionnaires. The study was designed this way to verify that participants who filled out the questionnaire were the ones that participated in the walk-and-talk and Figure-8 exercise. The walk-and-talk experience could have influenced how participants

responded during the questionnaire. During the walk-and-talk the staff member gave puppy raisers information about how they were doing in the program and how well their dog was progressing. They were also given the walk-and-talk form with their data either right after the walk-and-talk or shortly after the walk-and-talk. The way the raiser and dog performed in the walk-and-talk may have influenced how the raiser filled out the questionnaire. Correlations between the questionnaire and walk-and-talk data were not perfect or close to perfect, so it is unlikely that the walk-and-talk had a large influence on questionnaire scores. Future research is needed to examine if questionnaire scores would be different if they were given before the walk-and-talks.

Another limitation is the majority of puppy raisers filling out the questionnaire were female. The findings may not generalize to all puppy raisers, but only to female puppy raisers. Many studies have found differences in human-animal relationships between males and females (Dotson & Hyatt, 2008; Johnson, Garrity, & Stallones, 1992; Kafer, Lago, Wamboldt, & Harrington, 1984; Lewis, Krageloh, & Shepherd, 2009) and it is likely there are differences between males and females when examining puppy raiser-dog relationships. Future research is needed to recruit more male puppy raisers to fill out questionnaires so differences can be detected. One of the issues is that it could be that females are more likely to be the primary puppy raiser and thus more likely to participate in the Figure-8 exercise and fill out the questionnaire. This study was limited to only one puppy raiser per dog, but in many instances more than one person is in charge of caring for the dog. Future research is needed to examine the role all of the puppy raisers have with the dog.

Finally, this study examined relationships between puppy raisers and dogs, but did not examine how relationships influence the success of the dog or relationships between dogs and their future visually impaired partner. Understanding how or if puppy raiser-dog relationships influence a dog's success can help to determine how to best train puppy raisers and dogs. For example, if high Obedience is a significant predictor of success, attention could be placed on training puppy raisers to increase Obedience or to match dogs with raisers that are most likely going to promote high Obedience (e.g., high Conscientiousness, low Neuroticism).

Recommendations for Future Researchers

Collecting reliable data on relationships between puppy raisers and guide dogs can be difficult because it is hard to obtain large samples. Where possible, future studies should involve instruments with as few items as possible. This step helps in two ways. First, shorter instruments reduce the burden on participants, increasing participation levels and increasing data quality (Galesic & Bosnjak, 2000). Second, when there are fewer items, analyses such as factor analysis (which require a certain ratio of participants to questionnaire items), can be undertaken with greater confidence in the smaller samples that are available. Of course, the drive to reduce numbers of items must be balanced against the need to adequately sample the content domains of interest.

Also, when examining relationships between people and dogs, it is advantageous to obtain data from as many sources as possible. Self-reported questionnaires provide one important perspective on the relationship but other sources may provide valuable data too (John & Soto, 2007). For example, in this study, data could be collected from the puppy raiser, people familiar with the puppy raiser and the dog, staff members from GEB, as well as other kinds of data on the dog (e.g., hormones or other physiological measures).

Conclusion

The current study examines the relationship between puppy raisers and guide dogs in training. This study begins to address how puppy raiser-dog relationships are structured. This research also shows puppy raiser-dog relationships are mostly generalizable across occasion and somewhat generalizable across self and other perspectives. This research also suggests behavioral observations of puppy raiser-dog relationships can be captured in questionnaire responses. Finally, the research suggests both human and dog characteristics are important predictors of puppy raiser-dog relationships. Still, further research is needed to expand this work to understand the importance of puppy raiser-dog relationships in other domains such as in their ability to predict future working-dog success.

TABLES

Table 1. Result of PCA at 4-months with 5 factors extracted. Factor loadings higher than 0.300 are bolded.

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 1: Anthropomorphism					
I find it easier to talk to my dog than to people.	-.639	.058	.003	.092	-.034
My dog acts like a person not a dog.	-.623	-.066	.049	-.138	.046
I often tell my dog things I don't tell anyone else.	-.595	.079	.124	-.200	-.360
I treat my dog as a dog, not as a person.	.592	.028	-.088	.040	.002
I feel like I have more of a friendship with my dog than with my friends or family.	-.589	-.127	.069	-.142	.020
I talk to my dog about things like what is going on in my life often.	-.575	-.014	.125	-.383	-.264
My dog does not understand my feelings.	.575	-.208	-.228	.074	-.220
My dog does not comfort me when I am upset.	.555	-.056	.137	-.055	.086
My dog and I are very similar in the way we act.	-.510	.038	-.013	.079	.120
I play with my dog all the time.	-.432	.148	-.059	-.008	.279
My dog usually walks away when I pet him/her.	.410	.015	-.161	-.131	.054
My dog's personality is very similar to my own personality.	-.402	.137	.120	-.008	.063
I have attended most of the training classes with my dog.	.373	-.259	-.266	.039	.042
My dog seems to enjoy spending time with me.	.326	-.084	.187	.321	-.190
I yell at my dog when he/she does something bad.	-.311	-.245	-.078	-.051	-.111
I always let my dog sleep in the crate in my bedroom instead of some other place.	-.274	-.056	.261	-.010	-.131
I do not spend a lot of time cleaning and grooming my pet.	.272	-.120	.003	.120	-.088

Table 1 continued

Often, my dog does not understand the commands I give him/her.	.272	-.165	-.252	-.073	-.179
I have the same routine to socialize my dog every week.	-.227	.105	-.193	-.003	-.094
Factor 2: Obedience					
My dog does not always respond when I give him/her commands.	.254	-.666	.066	.148	-.015
My dog always pays attention to me and obeys me right away.	-.203	.572	.168	-.111	.014
Taking care of my dog has increased the stress in my life.	.285	-.546	.136	-.181	.170
My dog is constantly attentive to me.	-.196	.546	.075	-.221	.171
My dogs chews on things that he/she is not supposed to chew on.	.069	-.534	.147	-.261	-.015
I know how my dog will act in any situation.	-.199	.494	.028	.028	.019
I feel as if my dog is currently progressing well for his/her age.	.245	.476	.026	.140	-.027
My dog does not seem to be able to read my body language	-.015	-.472	-.130	-.100	-.057
I play fetch with my dog often.	-.245	-.373	-.101	-.085	.065
I socialize my dog at least several times a week.	.251	.368	-.128	.086	-.161
My dog understands me very well.	-.344	.367	.197	.083	.255
I feel like my dog makes too much mess.	-.029	-.359	.116	-.189	.168
My dog pays more attention to strangers than he/she does to me.	-.071	-.326	-.247	.084	.074
My dog obeys me to please me not just because I feed him/her food.	.073	.302	.094	.293	.164
When my dog is upset I give him/her time to return to a calm emotional state.	.179	.243	-.225	.218	.008
My dog initiates plays with me several times a day.	.070	-.233	.165	.027	.005
I focus more on my dog when he/she is doing something wrong than when he/she is doing something right.	-.165	-.224	-.194	-.035	.066

Table 1 continued

I am committed to taking care of my dog because it is for a worthwhile cause.	.031	-.214	.123	-.128	-.110
I wish my dog spent more time with someone else other than me.	.143	-.201	.002	.196	.149
Factor 3: Closeness					
My dog and I have a very close relationship.	-.157	.171	.582	.088	-.103
I sometimes give my dog table scraps.	.122	.106	.510	.095	.153
My dog is bonded with me.	.107	-.216	.488	.052	-.146
I think about my dog frequently when we are not together.	-.051	.051	.468	-.453	.112
I do not often talk about my dog to other people.	-.143	-.049	-.450	.208	.110
I feel as if my dog often stays closer to a family member or friend other than me.	.276	.050	-.423	-.267	-.095
My dog acts like he/she prefers someone else over me.	.358	.028	-.387	-.138	-.136
I like being near by dog all the time.	-.179	.351	.379	-.238	-.103
I never play with my dog when I am training him/her.	.110	-.021	.369	-.106	.079
I walk my dog several times a day.	.140	-.016	-.365	-.103	.067
My dog learns very slowly in comparison to other dogs.	.144	.074	-.360	.256	-.140
I feel emotionally attached to my dog.	-.044	-.203	.357	.153	-.262
My dog shows more interested in me than in my family/friends.	-.133	.270	.345	.035	.036
I praise my dog when he/she performs well.	.323	-.109	-.336	.191	-.329
I often incorporate play in to training sessions with my dog.	.194	.292	-.310	.267	-.056
My dog usually plays by himself/herself or someone else instead of me, even when I'm around.	.188	.013	-.305	-.117	.015
I spend more time with my other pets or dogs than my GEB dog.	.111	.278	-.297	.261	-.073

Table 1 continued

Giving up my dog will be more difficult than any other dog I have raised in the past.	.073	.039	.288	-.224	.035
It will not be difficult for me to give up my dog at the end of the puppy raising experience.	.052	-.030	-.284	.068	.251
Having to give up my dog is the most difficult part of raising my dog.	-.263	.131	.271	-.175	-.209
I often show off my dog and talk about my dog's purpose to others.	-.041	.046	.270	-.260	-.142
I can tell when my dog is about to misbehave.	.031	.037	-.218	.072	.180
Factor 4: Understanding of dog					
I feel like I have good dog sense when interacting with my dog.	-.027	.260	.053	.583	.026
I can read my dog's body language.	-.109	.054	-.060	.555	-.007
I feel like my dog is a wonderful companion for me.	-.171	.095	.458	.498	.001
I feel satisfied with my relationship with my dog.	-.154	.352	.255	.480	-.103
My dog is clever.	.173	-.004	.028	-.453	-.043
I enjoy playing with my dog.	.286	-.066	-.076	.446	.081
I enjoy the experience of raising a puppy.	.013	.227	-.017	.426	-.171
It is unnecessary to go to every training class for my dog.	.139	.196	.080	.411	-.005
My dog and I go through the same basic routine every day.	-.142	-.040	-.081	-.329	.044
My dog follows me wherever I go.	-.119	.088	.240	-.308	.108
My dog does not look at me often.	.269	-.012	.088	.306	-.007
I do not often call or email the puppy sitter to ask about my dog when I am away.	.033	-.078	-.150	.302	-.075
My dog does not follow me around the house very often.	.239	.142	-.234	.282	.016
My dog has improved my physical health.	-.152	.092	-.030	.198	.142

Table 1 continued

Factor 5: Care of dog					
Someone else other than me is usually the one that takes care of my dog.	.215	.251	-.232	-.089	-.592
I am the one most likely to notice when my dog is not feeling well.	.192	-.033	.037	-.059	.536
I interact or have close contact with my dog for a majority of the time I am awake.	.020	.115	-.015	-.197	.521
My dog spends more time with me than he/she does with anyone else.	-.043	-.147	.187	.083	.496
I am the person that checks to make sure my dog has water on a daily basis.	-.013	-.193	-.051	-.014	.474
I spend time every day training my dog.	.368	.159	-.198	.102	.463
My dog does not stay on command.	.151	-.239	-.045	.333	-.400
My dog often does not come when I call his/her name.	.171	-.331	-.077	-.117	-.389
My dog often shows love and affection to me.	.203	.085	.214	.040	-.387
I am the person that feeds my dog on a daily basis.	-.044	.000	-.124	.047	.378
I often buy my dog new toys.	.015	.079	-.166	-.316	.369
My dog and I spend quiet time such as watching TV, reading, or doing homework together.	-.060	-.005	-.133	.148	-.346
My dog acts like he/she is excited to see me every day when I come home.	.167	-.088	-.041	-.191	-.323
I spend a lot of time with my dog.	.246	-.247	.073	-.069	.304
I look at my dog often.	-.020	-.029	-.156	-.096	.292
I enjoy it when my dog sits close to me.	-.109	-.149	.240	-.014	-.267
My dog often is not interested in playing with me.	.220	.214	-.070	-.039	-.226

Table 1 continued

Percentage of variance explained	8.57%	6.14%	4.70%	4.10%	3.72%
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Table 2. Result of PCA at 8-months with 5 factors extracted. Factor loadings higher than 0.300 are bolded.

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 1: Obedience					
My dog and I have a very close relationship.	.683	.044	-.057	-.090	.094
My dog always pays attention to me and obeys me right away.	.577	-.200	.228	.021	-.055
Taking care of my dog has increased the stress in my life.	-.567	.151	.175	-.210	-.197
My dog does not always respond when I give him/her commands.	-.565	.227	.011	.053	.121
I feel like my dog is a wonderful companion for me.	.563	-.120	-.184	.081	.010
My dog seems to enjoy spending time with me.	.546	.274	-.051	-.254	.131
I feel satisfied with my relationship with my dog.	.527	.177	-.026	-.028	.247
My dog is constantly attentive to me.	.501	-.174	.047	-.309	-.174
My dog chews on things that he/she is not supposed to chew on.	-.437	.129	-.116	-.249	-.124
My dog often shows love and affection to me.	.417	.316	.137	-.221	-.002
My dog learns very slowly in comparison to other dogs.	-.413	.176	.119	-.173	-.012
My dog often does not come when I call his/her name.	-.390	.050	-.341	.121	.226
My dog and I are very similar in the way we act.	.379	-.368	-.006	.059	.210
Often, my dog does not understand the commands I give him/her.	-.379	.244	-.108	.029	.210
My dog does not look at me often.	-.378	.118	.037	.333	.345
My dog obeys me to please me, not just because I feed him/her food.	.374	.122	.101	-.263	.022
Having to give up my dog is the most difficult part of raising my dog.	.372	-.093	-.117	-.025	-.058
I sometimes give my dog table scraps.	.367	-.102	-.033	.041	-.030
I wish my dog spent more time with someone else other than me.	-.357	.102	.310	-.099	-.112

Table 2 continued

I feel like my dog makes too much mess.	-.355	.119	.092	.019	-.251
My dog's personality is very similar to my own personality.	.352	-.264	.189	.055	.032
I feel emotionally attached to my dog.	.325	.099	-.321	.021	-.149
I am committed to taking care of my dog because it is for a worthwhile cause.	-.178	.106	.050	.076	.166
Factor 2: Anthropomorphism					
I play with my dog all the time.	.166	-.583	-.109	-.233	.026
I treat my dog as a dog, not as a person.	-.199	.563	.046	.009	.032
My dog does not understand my feelings.	-.151	.518	-.001	.024	-.308
I do not spend a lot of time cleaning and grooming my pet.	-.004	.491	-.122	-.076	-.087
I feel like I have more of a friendship with my dog than with my friends or family.	.165	-.468	-.318	.086	.025
My dog does not seem to be able to read my body language.	-.202	.451	-.015	-.012	.121
I think about my dog frequently when we are not together.	-.085	-.428	-.399	.073	-.165
My dog acts like a person not a dog.	.232	-.404	-.115	-.057	.112
I like being near my dog all the time.	.111	-.391	-.307	.095	-.005
I have the same routine to socialize my dog every week.	-.123	-.382	-.128	.082	-.102
I do not often call or email the puppy sitter to ask about my dog when I am away.	-.079	.364	.057	-.033	.059
I have attended most of the training classes with my dog.	-.152	.347	-.086	.184	.111
I often buy my dog new toys.	-.163	-.341	-.108	-.127	-.199
My dog understands me very well.	.241	-.306	.162	-.073	.152
My dog pays more attention to strangers than he she does with me.	-.243	.278	-.150	.106	.005
I often show off my dog and talk about my dog's purpose to others.	.172	-.263	-.150	.119	-.158

Table 2 continued

My dog shows more interest in me than in my family friends.	-.076	-.220	.020	-.055	-.003
I feel as if my dog often stays closer to a family member or friend other than me.	.001	.154	-.076	.023	.041
Factor 3: Closeness					
I find it easier to talk to my dog than to people.	.204	-.290	-.538	.028	.112
I often tell my dog things I don't tell anyone else.	.031	-.373	-.491	-.102	.148
I socialize my dog at least several times a week.	-.124	-.203	.466	.241	.024
I spend time every day training my dog.	-.193	-.221	.425	.217	-.032
I know how my dog will act in any situation.	.194	-.241	.409	-.004	.059
I enjoy it when my dog sits close to me.	-.124	-.121	-.407	-.035	-.145
My dog does not comfort me when I am upset.	-.267	.282	.404	.103	.072
I talk to my dog about things like what is going on in my life often.	.101	-.383	-.385	-.145	.155
I do not often talk about my dog to other people.	.016	.183	.334	-.107	.041
I can tell when my dog is about to misbehave.	.163	.020	.333	-.012	.089
My dog does not stay on command.	-.271	.171	-.311	-.224	.217
I walk my dog several times a day.	-.273	-.181	.305	.107	-.172
I am the one most likely to notice when my dog is not feeling well.	-.009	.021	.278	-.163	-.104
It is unnecessary to go to every training class for my dog.	.173	-.077	.246	-.024	-.181
I can read my dogs body language.	-.049	.109	.226	.139	.119
I always let my dog sleep in the crate in my bedroom instead of some other place.	.051	.011	-.222	-.007	.028
I focus on my dog more when he/she is doing something wrong than when he/she is doing something right.	-.140	-.061	-.201	.116	-.061

Table 2 continued

My dog and I spend quiet time such as watching TV, reading, or doing homework together.	-.154	-.103	.188	-.064	.030
I yell at my dog when he/she does something bad.	.034	-.079	-.133	-.081	-.132
Factor 4: Understanding of dog					
My dog often is not interested in playing with me.	-.245	-.053	-.156	.557	-.242
My dog is bonded with me.	.310	.167	.145	-.547	.207
I feel like I have good dog sense when interacting with my dog.	.264	-.100	.315	.537	.046
My dog does not follow me around the house very often.	-.140	.174	.294	.495	.041
My dog follows me wherever I go.	.194	-.308	.001	-.488	-.050
I feel as if my dog is currently progressing well for his/her age.	.469	.150	.015	.481	.056
My dog initiates play with me several times a day.	-.091	.132	.053	-.474	-.068
My dog acts like he/she prefers someone else over me.	-.164	.036	-.144	.404	-.031
I enjoy the experience of raising a puppy.	-.001	.298	-.135	.372	.305
Giving up my dog will be more difficult than any other dog I have raised in the past.	.142	-.137	-.105	-.338	-.189
I often incorporate play into training sessions with my dog.	.085	.144	.128	.292	.145
I spend a lot of time with my dog.	.083	.146	.051	.280	-.240
I look at my dog often.	.190	-.051	-.183	.266	-.066
My dog has improved my physical health.	.055	-.097	-.077	.249	-.061
My dog usually plays by himself/herself or someone else instead of me even when I'm around.	.043	.077	.044	.245	-.005
When my dog is upset I give him/her time to return to a calm emotional state.	-.018	.076	.027	.234	.173
I never play with my dog when I am training him/her.	-.034	.193	-.034	-.225	.059

Table 2 continued

Factor 5: Care of dog					
I am the person that feeds my dog on a daily basis.	.041	.087	.162	-.012	-.632
I am the person that checks to make sure my dog has water on a daily basis.	-.100	.133	.084	-.250	-.502
My dog spends more time with me than he she does with anyone else.	-.158	-.021	.226	-.022	-.497
Someone else other than me is usually the one that takes care of my dog.	.097	-.104	-.100	.024	.465
I enjoy playing with my dog.	.053	.205	-.117	.219	.463
I play fetch with my dog often.	-.032	-.087	.272	-.252	.437
My dog acts like he she is excited to see me every day when I come home.	-.045	.174	.069	-.085	.423
I spend more time with my other pets or dogs than my GEB dog.	-.201	.122	.205	.019	.403
I interact or have close contact with my dog for a majority of the time I am awake.	.018	-.145	-.223	.070	-.397
My dog and I go through the same basic routine every day.	-.164	.086	-.208	.032	-.314
I praise my dog when he she performs well.	.032	.265	.090	.074	.270
It will not be difficult for me to give up my dog at the end of the puppy raising experience.	-.056	-.036	.216	-.088	.239
My dog is clever.	.039	-.009	.189	-.144	.230
My dog usually walks away when I pet him her.	-.086	.196	.164	.069	-.220
Percentage of variance explained	8.47%	5.30%	4.55%	4.02%	3.42%

Table 3. Result of PCA at 13-months with 5 factors extracted. Factor loadings higher than 0.300 are bolded.

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 1: Anthropomorphism					
I talk to my dog about things like what is going on in my life often.	-.637	.075	-.197	.017	.008
I often tell my dog things I don't tell anyone else.	-.595	.015	-.155	.158	.028
My dog does not understand my feelings.	.567	.200	.021	-.064	-.099
Having to give up my dog is the most difficult part of raising my dog.	-.564	.106	-.065	.259	.002
I find it easier to talk to my dog than to people.	-.561	-.041	-.274	-.004	.019
I think about my dog frequently when we are not together.	-.514	.094	.068	-.205	.224
My dog's personality is very similar to my own personality.	-.511	-.422	.186	-.033	-.031
I do not often talk about my dog to other people.	.493	-.077	-.099	.016	.022
I feel like I have more of a friendship with my dog than with my friends or family.	-.493	-.073	-.163	-.060	-.147
I do not often call or email the puppy sitter to ask about my dog when I am away.	.481	.109	.077	.075	.040
I wish my dog spent more time with someone else other than me.	.445	.018	.162	-.008	-.132
My dog and I are very similar in the way we act.	-.439	-.374	.096	.016	.034
I treat my dog as a dog, not as a person.	.409	.305	-.045	.158	-.071
It will not be difficult for me to give up my dog at the end of the puppy raising experience.	.365	-.364	.005	.009	-.267
My dog does not comfort me when I am upset.	.347	.343	.235	-.082	-.243
My dog understands me very well.	-.344	-.178	-.061	.236	.288
I often buy my dog new toys.	-.339	-.093	-.026	-.067	.058
I enjoy it when my dog sits close to me.	-.330	.214	.286	-.297	.180

Table 3 continued

Giving up my dog will be more difficult than any other dog I have raised in the past.	-.315	.187	.046	.062	.233
I have attended most of the training classes with my dog.	.242	.231	.014	.125	-.209
I walk my dog several times a day.	.235	-.065	-.158	.194	-.030
Factor 2: Obedience					
My dog does not always respond when I give him/her commands.	.042	.713	.144	-.152	-.133
My dog always pays attention to me and obeys me right away.	-.085	-.712	-.081	.093	.096
My dog is constantly attentive to me.	.010	-.576	.026	-.094	.026
I play with my dog all the time.	-.199	-.473	-.099	-.138	-.100
I know how my dog will act in any situation.	.041	-.387	-.014	.119	.091
My dog does not stay on command.	.009	.383	-.117	.040	.055
I never play with my dog when I am training him/her.	-.133	.358	.280	.011	.178
My dog acts like a person not a dog.	-.324	-.325	.248	-.011	-.185
My dog often does not come when I call his/her name.	.039	.322	-.021	-.174	-.112
My dog obeys me to please me, not just because I feed him/her food.	.019	-.312	-.099	.071	.111
I often incorporate play into training sessions with my dog.	.274	-.312	-.127	.155	-.203
My dog does not seem to be able to read my body language.	.275	.298	.127	.064	-.084
My dog follows me wherever I go.	-.215	-.293	.051	-.267	-.014
My dog does not look at me often.	.191	.222	.067	.170	-.011
Often, my dog does not understand the commands I give him/her.	-.021	.220	-.082	-.099	.071
I do not spend a lot of time cleaning and grooming my pet.	.108	.182	.063	-.101	-.162
I play fetch with my dog often.	.057	-.139	.133	-.065	.094
Factor 3: Care of dog					

Table 3 continued

My dog spends more time with me than he/she does with anyone else.	.101	-.067	-.693	.058	-.049
Someone else other than me is usually the one that takes care of my dog.	-.021	.168	.653	.048	.050
I am the person that feeds my dog on a daily basis.	-.170	.090	-.595	.018	-.155
I am the person that checks to make sure my dog has water on a daily basis.	-.097	.170	-.479	.085	-.074
My dog shows more interest in me than in my family friends.	-.078	.001	-.464	-.087	.086
I am the one most likely to notice when my dog is not feeling well.	.073	.029	-.458	-.045	-.196
I spend a lot of time with my dog.	.300	-.019	-.417	.042	.281
My dog acts like he she prefers someone else over me.	.090	.184	.377	-.095	-.235
I am committed to taking care of my dog because it is for a worthwhile cause.	.173	.189	.372	.258	-.063
I feel as if my dog often stays closer to a family member or friend other than me.	.152	-.074	.352	.023	-.206
I praise my dog when he/she performs well.	.096	.192	.348	.295	-.086
I can tell when my dog is about to misbehave.	.044	-.124	.304	-.058	-.029
I have the same routine to socialize my dog every week.	.037	-.194	-.244	-.184	.055
I always let my dog sleep in the crate in my bedroom instead of some other place.	-.117	-.223	-.239	-.177	.017
My dog is clever.	.102	.045	.202	-.143	-.165
Factor 4: Understanding of dog					
My dog chews on things that he/she is not supposed to chew on.	.182	.140	.148	-.644	.096
I spend time every day training my dog.	.091	.122	.029	.524	-.009

Table 3 continued

I socialize my dog at least several times a week.	.366	-.060	-.041	.484	.005
I enjoy the experience of raising a puppy.	-.008	-.020	.036	.438	-.060
I look at my dog often.	-.118	.174	.105	-.426	.130
I feel as if my dog is currently progressing well for his/her age.	-.046	-.075	.079	.406	-.050
I feel satisfied with my relationship with my dog.	-.109	.055	.059	.404	.184
Taking care of my dog has increased the stress in my life.	.277	.294	.102	-.399	-.025
My dog initiates play with me several times a day.	.123	-.227	.329	-.393	.188
I feel like my dog makes too much mess.	.093	.108	.053	-.338	.077
I focus on my dog more when he/she is doing something wrong than when he/she is doing something right.	.260	.315	-.099	-.332	-.137
My dog does not follow me around the house very often.	.283	.258	-.097	.323	.085
My dog usually walks away when I pet him her.	.058	.101	.077	.323	-.037
My dog acts like he she is excited to see me every day when I come home.	.209	.038	.262	-.322	.155
My dog often is not interested in playing with me.	.101	-.084	-.138	.254	-.078
I spend more time with my other pets or dogs than my GEB dog.	.211	-.003	.096	.242	.178
My dog learns very slowly in comparison to other dogs.	-.012	.205	.001	.242	.135
I can read my dog's body language.	.166	.055	.046	.237	.109
My dog and I go through the same basic routine every day.	-.028	.072	-.163	-.228	-.192
I feel like I have good dog sense when interacting with my dog.	.129	-.053	.111	.196	.117
My dog has improved my physical health.	-.144	-.037	-.061	.167	.160
It is unnecessary to go to every training class for my dog.	-.027	-.091	-.133	.144	.141
Factor 5: Closeness					
My dog and I have a very close relationship.	-.092	.021	-.103	-.152	.536

Table 3 continued

My dog is bonded with me.	-.020	.058	.033	.022	.498
My dog pays more attention to strangers than he she does with me.	.027	.061	.371	-.094	-.471
I feel like my dog is a wonderful companion for me.	-.079	-.062	-.168	-.028	.465
I feel emotionally attached to my dog.	-.300	.271	-.048	-.164	.463
My dog often shows love and affection to me.	-.051	-.013	.085	.016	.424
My dog seems to enjoy spending time with me.	.264	-.116	.224	-.089	.402
I sometimes give my dog table scraps.	-.040	-.126	.059	.015	.324
I interact or have close contact with my dog for a majority of the time I am awake.	.032	-.105	-.293	.069	.302
I like being near my dog all the time.	-.284	-.236	.067	-.277	.300
I yell at my dog when he she does something bad.	-.182	.220	-.106	-.265	-.282
I often show off my dog and talk about my dog's purpose to others.	-.225	.045	.167	-.023	-.265
My dog and I spend quiet time such as watching TV, reading, or doing homework together.	-.020	-.092	-.030	.131	-.255
When my dog is upset I give him her time to return to a calm emotional state.	.183	.007	-.057	.190	.225
My dog usually plays by himself/herself or someone else instead of me, even when I'm around.	.173	.110	.210	.143	-.211
I enjoy playing with my dog.	-.039	-.006	.039	-.075	.101
Percentage of variance explained	7.82%	5.26%	4.28%	3.90%	3.53%

Table 4. Generalizability across testing occasion. Numbers represent intra-class correlation coefficients (ICCs). Averages calculated using Fisher's r to z transformation.

	4 to 8-month	8 to 13-month	Average
I play with my dog all the time.	0.79	0.76	0.78
My dog initiates plays with me several times a day.	0.45	0.56	0.51
My dog usually plays by himself/herself or someone else instead of me, even when I'm around.	0.32	0.55	0.44
I play fetch with my dog often.	0.62	0.55	0.59
I often incorporate play in to training sessions with my dog.	0.78	0.75	0.77
I never play with my dog when I am training him/her.	0.67	0.44	0.57
I do not spend a lot of time cleaning and grooming my pet.	0.48	0.64	0.57
I walk my dog several times a day.	0.82	0.65	0.75
I have the same routine to socialize my dog every week.	0.73	0.33	0.56
I socialize my dog at least several times a week.	0.33	0.58	0.46
My dog does not comfort me when I am upset.	0.72	0.85	0.79
When my dog is upset I give him/her time to return to a calm emotional state.	0.06	0.81	0.53
My dog does not follow me around the house very often.	0.76	0.73	0.75
My dog and I spend quiet time such as watching TV, reading, or doing homework together.	0.55	0.49	0.52
I talk to my dog about things like what is going on in my life often.	0.64	0.83	0.75
I spend time every day training my dog.	0.76	0.78	0.77
I am the person that feeds my dog on a daily basis.	0.82	0.76	0.79
I am the person that checks to make sure my dog has water on a daily basis.	0.65	0.63	0.64

Table 4 continued

My dog and I go through the same basic routine every day.	0.62	0.27	0.46
I feel as if my dog often stays physically closer to a family member or a friend other than me.	0.51	0.73	0.63
I enjoy playing with my dog.	0.38	0.44	0.41
My dog often is not interested in playing with me.	0.69	0.65	0.67
Often, my dog does not understand the commands I give him/her.	0.45	0.51	0.48
My dog obeys me to please me not just because I feed him/her food.	0.39	0.67	0.55
I praise my dog when he/she performs well.	0.61	0.64	0.63
I yell at my dog when he/she does something bad.	0.50	0.58	0.54
I can read my dog's body language.	0.50	0.44	0.47
My dog does not seem to be able to read my body language	0.40	0.66	0.54
I am the one most likely to notice when my dog is not feeling / well.	0.61	0.06	0.37
I enjoy it when my dog sits close to me.	0.62	0.77	0.70
My dog acts like he/she is excited to see me every day when I come home.	0.44	0.19	0.32
My dog often shows love and affection to me.	0.58	0.41	0.50
My dog is constantly attentive to me.	0.53	0.39	0.46
My dog does not look at me often.	0.56	0.28	0.43
I look at my dog often.	0.57	0.47	0.52
My dog acts like a person, not a dog.	0.76	0.44	0.63
I treat my dog as a dog, not as a person.	0.81	0.36	0.64
My dog acts like he/she prefers someone else over me.	0.71	0.79	0.75
I spend a lot of time with my dog.	0.71	0.57	0.65
I spend more time with my other pets or dogs than my GEB dog.	0.27	0.42	0.35
I like being near by dog all the time.	0.84	0.79	0.82

Table 4 continued

I wish my dog spent more time with someone else other than me.	0.21	0.58	0.41
Someone else other than me is usually the one that takes care of my dog.	0.78	0.57	0.69
I interact or have close contact with my dog for a majority of the time I am awake.	0.57	0.71	0.65
My dog spends more time with me than he/she does with anyone else.	0.79	0.78	0.79
My dog follows me wherever I go.	0.63	0.55	0.59
I focus on my dog more when he/she is doing something wrong than when he/she is doing something right.	0.63	0.54	0.59
My dog's personality is very similar to my own personality.	0.49	0.73	0.62
My dog and I are very similar in the way we act.	0.70	0.85	0.79
My dog does not always respond when I give him/her commands.	0.59	0.67	0.63
My dog always pays attention to me and obeys me right away.	0.56	0.66	0.61
My dog often does not come when I call his/her name.	0.46	0.50	0.48
My dog does not stay on command.	0.57	0.74	0.66
My dog is bonded with me.	0.38	0.60	0.50
I feel emotionally attached to my dog.	0.68	0.74	0.71
My dog usually walks away when I pet him/her.	0.63	0.59	0.61
My dog and I have a very close relationship.	0.69	0.36	0.55
My dog does not understand my feelings.	0.45	0.59	0.52
My dog pays more attention to strangers than he/she does to me.	0.46	0.49	0.48
My dog shows more interested in me than in my family/friends.	0.15	0.41	0.29
I feel satisfied with my relationship with my dog.	0.25	0.46	0.36
My dog seems to enjoy spending time with me.	0.76	0.52	0.66
I do not often call or email the puppy sitter to ask about my dog when I am away.	0.40	0.79	0.63
I find it easier to talk to my dog than to people.	0.74	0.90	0.84

Table 4 continued

I often tell my dog things I don't tell anyone else.	0.87	0.78	0.83
I feel like I have more of a friendship with my dog than with my friends or family.	0.79	0.75	0.77
I feel like my dog is a wonderful companion for me.	0.48	0.74	0.63
I feel like I have good dog sense when interacting with my dog.	0.62	0.73	0.68
My dog learns very slowly in comparison to other dogs.	0.44	0.11	0.28
I know how my dog will act in any situation.	0.51	0.59	0.55
I can tell when my dog is about to misbehave.	0.48	0.78	0.66
My dog understands me very well.	0.68	0.78	0.73
I have attended most of the training classes with my dog.	-0.01	0.57	0.31
It is unnecessary to go to every training class for my dog.	0.42	0.85	0.69
I am committed to taking care of my dog because it is for a worthwhile cause.	0.48	0.56	0.52
I feel like my dog makes too much mess.	0.51	0.74	0.64
I often buy my dog new toys.	0.78	0.76	0.77
I sometimes give my dog table scraps.	0.37	0.73	0.58
I think about my dog frequently when we are not together.	0.73	0.88	0.82
I enjoy the experience of raising a puppy.	0.20	0.62	0.43
Having to give up my dog is the most difficult part of raising my dog.	0.88	0.85	0.87
It will not be difficult for me to give up my dog at the end of the puppy raising experience.	0.24	0.19	0.22
Giving up my dog will be more difficult than any other dog I have raised in the past.	0.62	0.62	0.62
I do not often talk about my dog to other people.	0.69	0.61	0.65
I often show off my dog and talk about my dog's purpose to others.	0.55	0.76	0.67
I feel as if my dog is currently progressing well for his/her age.	0.46	0.72	0.61

Table 4 continued

Taking care of my dog has increased the stress in my life.	0.55	0.81	0.70
My dog has improved my physical health.	0.75	0.71	0.73
My dog is clever.	0.78	0.23	0.56
My dog chews on things that he/she is not supposed to chew on.	0.78	0.69	0.74
I always let my dog sleep in the crate in my bedroom instead of some other place.	0.81	0.82	0.82
Based on your own current knowledge about your dog, how likely do you think it is that your dog will pass his/her IFT?	0.64	0.75	0.70
Based on your own current knowledge about your dog, how likely do you think it is that your dog will graduate as a guide dog?	0.87	0.78	0.83
Item Average	0.61	0.64	0.63
Anthropomorphism	0.76	0.79	0.78
Obedience	0.69	0.73	0.71
Closeness	0.01	-0.12	-0.06
Understanding of dog	0.50	0.38	0.44
Care of dog	0.76	0.57	0.68
Factor Average	0.59	0.53	0.56

Table 5. Information about informants who filled out the questionnaire when dogs were 4, 8, and 13-months.

	4-month	8-month	13-month
Number of informants			
1 informant	36	31	33
2 informants	23	29	28
3 informants	11	6	8
Mean years informant knew participants	18.45 (SD = 14.70)	15.86 (SD = 13.07)	14.81 (SD = 13.38)
Mean months informant knew participant dog	3.67 (SD = 2.06)	6.9 (SD = 2.22)	11.33 (SD = 3.50)
Relationship of informant			
Friend from GEB	24.2%	22.4%	31.0%
Non-GEB friend	18.9%	27.1%	19.5%
Spouse	23.5%	20.6%	21.2%
Parent/grandparent	15.9%	8.4%	21.2%
Children	6.8%	8.4%	5.3%
Other relative	4.5%	6.5%	5.3%
Other	3.0%	6.5%	6.2%

Table 6. Generalizability across self and other perspectives at 4, 8, and 13-months of age. Numbers represent intra-class correlation coefficients (ICCs). Averages calculated using Fisher's r to z transformation.

	4-month	8-month	13-month	Average
I play with my dog all the time.	0.17	0.39	0.16	0.24
My dog initiates plays with me several times a day	0.27	0.10	0.36	0.25
My dog usually plays by himself/herself or someone else instead of me, even when I'm around.	0.40	0.27	0.06	0.25
I play fetch with my dog often.	0.42	0.40	0.44	0.42
I often incorporate play in to training sessions with my dog.	0.62	0.45	0.30	0.47
I never play with my dog when I am training him/her.	0.38	-0.14	0.06	0.11
I do not spend a lot of time cleaning and grooming my pet.	0.30	0.56	0.25	0.38
I walk my dog several times a day.	0.52	0.04	0.56	0.39
I have the same routine to socialize my dog every week.	-0.07	0.26	-0.20	0.00
I socialize my dog at least several times a week.	0.55	0.27	0.10	0.32
My dog does not comfort me when I am upset.	0.55	0.39	0.26	0.41
When my dog is upset I give him/her time to return to a calm emotional state.	0.26	0.07	0.32	0.22
My dog does not follow me around the house very often.	0.08	0.34	0.28	0.24
My dog and I spend quiet time such as watching TV, reading, or doing homework together.	0.37	0.44	-0.15	0.23
I talk to my dog about things like what is going on in my life often.	0.30	0.29	0.17	0.25
I spend time every day training my dog.	0.19	0.13	0.05	0.12
I am the person that feeds my dog on a daily basis.	0.79	0.69	0.35	0.64

Table 6 continued

I am the person that checks to make sure my dog has water on a daily basis.	0.44	0.42	0.21	0.36
My dog and I go through the same basic routine every day.	0.42	0.29	0.05	0.26
I feel as if my dog often stays physically closer to a family member or a friend other than me.	0.51	0.32	0.35	0.40
I enjoy playing with my dog.	-0.06	0.44	-0.35	0.02
My dog often is not interested in playing with me.	-0.28	0.15	0.25	0.04
Often, my dog does not understand the commands I give him/her.	0.00	0.24	0.07	0.10
My dog obeys me to please me not just because I feed him/her food.	0.31	0.48	0.13	0.31
I praise my dog when he/she performs well.	0.36	-0.16	0.33	0.18
I yell at my dog when he/she does something bad.	0.22	0.33	0.25	0.27
I can read my dog's body language.	0.06	-0.21	-0.28	-0.15
My dog does not seem to be able to read my body language	0.08	0.12	0.14	0.11
I am the one most likely to notice when my dog is not feeling / well.	0.20	0.36	0.37	0.31
I enjoy it when my dog sits close to me.	0.11	0.32	-0.08	0.12
My dog acts like he/she is excited to see me every day when I come home.	0.25	0.41	0.10	0.26
My dog often shows love and affection to me.	0.19	0.26	0.21	0.22
My dog is constantly attentive to me.	0.20	0.12	0.15	0.16
My dog does not look at me often.	-0.44	-0.55	0.40	-0.22
I look at my dog often.	0.07	0.15	0.08	0.10
My dog acts like a person, not a dog.	0.45	0.48	0.33	0.42
I treat my dog as a dog, not as a person.	0.32	0.24	0.27	0.28
My dog acts like he/she prefers someone else over me.	0.41	0.27	0.37	0.35
I spend a lot of time with my dog.	-0.20	0.39	0.46	0.23
I spend more time with my other pets or dogs than my GEB dog.	0.10	0.33	-0.08	0.12

Table 6 continued

I like being near by dog all the time.	0.22	0.21	0.43	0.29
I wish my dog spent more time with someone else other than me.	0.16	0.25	0.47	0.30
Someone else other than me is usually the one that takes care of my dog.	0.49	0.43	0.58	0.50
I interact or have close contact with my dog for a majority of the time I am awake.	0.34	0.51	0.20	0.36
My dog spends more time with me than he/she does with anyone else.	0.57	0.57	0.50	0.55
My dog follows me wherever I go.	0.63	0.29	0.43	0.46
I focus on my dog more when he/she is doing something wrong than when he/she is doing something right.	0.03	0.08	0.25	0.12
My dog's personality is very similar to my own personality.	0.31	0.44	0.57	0.45
My dog and I are very similar in the way we act.	-0.15	0.28	0.25	0.13
My dog does not always respond when I give him/her commands.	0.24	0.41	0.49	0.38
My dog always pays attention to me and obeys me right away.	0.45	0.38	0.47	0.43
My dog often does not come when I call his/her name.	0.23	0.24	0.34	0.27
My dog does not stay on command.	0.15	0.03	0.39	0.20
My dog is bonded with me.	-0.73	0.00	0.18	-0.24
I feel emotionally attached to my dog.	-0.27	-0.01	0.31	0.01
My dog usually walks away when I pet him/her.	-0.21	0.29	-0.07	0.01
My dog and I have a very close relationship.	0.17	0.25	0.41	0.28
My dog does not understand my feelings.	0.12	0.09	-0.26	-0.02
My dog pays more attention to strangers than he/she does to me.	0.03	0.37	0.16	0.19
My dog shows more interested in me than in my family/friends.	0.31	0.25	0.04	0.20
I feel satisfied with my relationship with my dog.	0.50	-0.11	0.39	0.28
My dog seems to enjoy spending time with me.	-0.23	0.18	-0.03	-0.03

Table 6 continued

I do not often call or email the puppy sitter to ask about my dog when I am away.	0.23	0.55	0.49	0.43
I find it easier to talk to my dog than to people.	0.67	0.44	0.25	0.47
I often tell my dog things I don't tell anyone else.	0.59	0.34	0.45	0.47
I feel like I have more of a friendship with my dog than with my friends or family.	0.46	0.41	0.37	0.41
I feel like my dog is a wonderful companion for me.	0.41	0.06	0.05	0.18
I feel like I have good dog sense when interacting with my dog.	-0.08	0.16	0.50	0.21
My dog learns very slowly in comparison to other dogs.	0.03	0.11	-0.04	0.03
I know how my dog will act in any situation.	0.45	0.47	0.03	0.33
I can tell when my dog is about to misbehave.	0.23	0.19	0.25	0.22
My dog understands me very well.	0.31	0.05	0.14	0.17
I have attended most of the training classes with my dog.	0.25	-0.16	0.61	0.26
It is unnecessary to go to every training class for my dog.	0.29	0.37	0.35	0.34
I am committed to taking care of my dog because it is for a worthwhile cause.	-0.24	-0.06	0.32	0.01
I feel like my dog makes too much mess.	0.29	0.16	0.27	0.24
I often buy my dog new toys.	0.63	0.19	0.53	0.47
I sometimes give my dog table scraps.	0.29	0.83	0.38	0.56
I think about my dog frequently when we are not together.	0.30	0.24	0.09	0.21
I enjoy the experience of raising a puppy.	0.64	0.45	0.34	0.49
Having to give up my dog is the most difficult part of raising my dog.	0.30	0.52	0.38	0.40
It will not be difficult for me to give up my dog at the end of the puppy raising experience.	0.09	0.44	0.39	0.31

Table 6 continued

Giving up my dog will be more difficult than any other dog I have raised in the past.	0.25	0.58	0.42	0.43
I do not often talk about my dog to other people.	0.15	-0.09	0.16	0.07
I often show off my dog and talk about my dog's purpose to others.	0.40	0.02	0.10	0.18
I feel as if my dog is currently progressing well for his/her age.	0.45	0.49	0.45	0.46
Taking care of my dog has increased the stress in my life.	0.58	0.41	0.49	0.50
My dog has improved my physical health.	0.20	0.37	0.30	0.29
My dog is clever.	-0.22	0.21	0.39	0.13
My dog chews on things that he/she is not supposed to chew on.	0.58	0.56	0.67	0.61
I always let my dog sleep in the crate in my bedroom instead of some other place.	0.74	0.59	0.62	0.66
Item Average	0.26	0.29	0.27	0.27
Anthropomorphism	0.61	0.53	0.47	0.54
Obedience	0.50	0.33	0.55	0.46
Closeness	0.61	0.54	0.50	0.55
Understanding of dog	0.29	0.49	0.55	0.45
Care of dog	0.56	0.44	0.48	0.50
Factor Average	0.52	0.47	0.51	0.50

Table 7. Factor loadings from the walk-and-talk data at 4-months.

Item	Relationship skills
Pup is able to walk without pulling	.842
Follow me- pup is taking 50% responsibility	.816
Pup is at appropriate skill level for his age	.792
Raiser allows pup time to resolve conflict	.755
Raiser keeps a loose leash	.755
Pup checks in	.716
Repeated positive experiences	.692
Raiser's use of you meets the pup's needs	.680
Pup in the Green zone	.669
Raiser provides clear communication	.665
Raiser progressing pup's skills	.622
Pup responds to name response	.618
Raiser gives food rewards properly	.609
Pup takes rewards properly	.565
Raiser uses skills to direct	.557
Pup settles	.546
Pup left alone uncruated	.462
Percentage of variance explained	45.69%

Table 8 Factor loadings from the walk-and-talk data at 8-months.

Item	Relationship skills
Pup is at appropriate skill level for his age	.892
Raiser allows pup time to resolve conflict	.830
Pup responds to name response	.822
Raiser keeps a loose leash	.805
Raiser provides clear communication	.795
Raiser's use of you meets the pup's needs	.779
Follow me- pup is taking 50% responsibility	.753
Raiser progressing pup's skills	.733
Raiser uses skills to direct	.717
Pup checks in	.700
Pup settles	.656
Pup is able to walk without pulling	.621
Raiser gives food rewards properly	.607
Pup in the Green zone	.606
Repeated positive experiences	.597
Pup takes rewards properly	.551
Pup left alone uncruled	.486
Percentage of variance explained	50.62%

Table 9. Factor loadings from the walk-and-talk data at 13-months.

Item	Relationship skills
Raiser allows pup time to resolve conflict	.830
Follow me- pup is taking 50% responsibility	.783
Pup responds to name response	.773
Repeated positive experiences	.764
Pup in the Green zone	.745
Raiser keeps a loose leash	.716
Raiser provides clear communication	.702
Pup takes rewards properly	.689
Raiser gives food rewards properly	.683
Pup is able to walk without pulling	.678
Pup settles	.670
Pup checks in	.661
Pup is at appropriate skill level for his age	.638
Raiser's use of you meets the pup's needs	.616
Pup left alone uncrationed	.606
Raiser uses skills to direct	.593
Raiser progressing pup's skills	.558
Percentage of variance explained	50.62%

Table 10. Criterion validity correlations between factors from the Relationship Questionnaire and items from the walk-and-talk at 4-months.

	Anthropomorphism	Obedience	Closeness	Understanding of dog	Care of dog
Pup in the green zone	-0.14	0.11	0.01	0.23 [*]	-0.01
Raiser allows pup time to resolve conflict	0.10	0.18	0.17	0.08	0.03
Pup checks in	0.00	0.27 ^{**}	0.08	0.23	0.19
Pup responds to name	0.01	0.07	-0.03	0.20	0.17
Pup taking responsibility during follow me	0.02	0.24 [*]	-0.08	0.24 [*]	0.20
Raiser use of you	0.01	0.29 ^{**}	0.12	0.17	0.11
Raiser provides clear communication	-0.01	0.32^{**}	0.01	0.40^{**}	0.13
Raiser gives food rewards properly	0.12	0.05	0.02	0.09	0.00
Pup takes rewards properly	0.03	0.10	0.02	0.08	0.17
Pup walks without pulling	0.11	0.22 [*]	0.09	0.21 [*]	0.14
Raiser keeps a loose leash	0.11	0.12	0.08	0.20 ⁺	0.06
Repeated positive experiences	-0.01	0.17	-0.07	0.10	0.15
Pup settles	-0.07	0.25 [*]	0.19	0.37^{**}	0.14
Pup left alone uncrated	-0.03	0.14	-0.03	0.23 [*]	0.03
Raiser uses skills to direct	-0.16	0.20	-0.04	0.35^{**}	0.18
Raising progressing skills	0.09	0.27 ^{**}	0.02	0.10	0.13
Pup at appropriate skill level	0.13	0.24	0.07	0.24 [*]	0.24 [*]
N	100	100	100	100	100
Relationship skills	0.03	0.31 ^{**}	0.07	0.33 ^{**}	0.18

^{**} = <0.01, ^{*} = <0.05, items that remain significant after using Bonferroni corrections are printed in bold typeface

Table 11. Criterion validity correlations between factors from the Relationship Questionnaire and items from the walk-and-talk at 8-months.

	Anthropomorphi sm	Obedience	Closeness	Understanding of dog	Care of dog
Pup in the green zone	0.01	0.13	0.16	0.19	-0.04
Raiser allows pup time to resolve conflict	-0.06	0.08	0.09	0.09	-0.04
Pup checks in	0.05	0.22*	0.01	0.02	-0.06
Pup responds to name	0.00	0.19	0.00	0.01	-0.07
Pup taking responsibility during follow me	0.09	0.10	0.02	0.04	-0.20
Raiser use of you	-0.01	0.12	0.02	0.23*	-0.06
Raiser provides clear communication	-0.07	0.14	0.11	0.24*	-0.14
Raiser gives food rewards properly	-0.16	0.08	0.10	0.00	-0.09
Pup takes rewards properly	0.00	0.00	0.05	0.08	0.01
Pup walks without pulling	-0.06	0.09	0.06	0.09	-0.17
Raiser keeps a loose leash	-0.04	0.02	0.04	0.12	-0.07
Repeated positive experiences	0.05	0.29**	0.10	0.07	-0.12
Pup settles	0.09	0.09	0.01	0.12	0.02
Pup left alone uncrated	0.07	0.17	-0.03	-0.10	0.16
Raiser uses skills to direct	-0.08	0.05	0.08	-0.04	0.08
Raising progressing skills	-0.03	0.08	0.10	0.11	-0.19
Pup at appropriate skill level	-0.05	0.09	0.11	0.22*	-0.13
N	93	93	93	93	93
Relationship skills	0.00	0.18	0.08	0.14	-0.08

** = <0.01, * = <0.05, None of the findings in this table remained significant after making Bonferroni corrections.

Table 12. Criterion validity correlations between factors from the Relationship Questionnaire and items from the walk-and-talk at 13-months.

	Anthropomorphism	Obedience	Closeness	Understanding of dog	Care of dog
Pup in the green zone	-0.11	0.13	0.06	0.27**	0.10
Raiser allows pup time to resolve conflict	-0.10	0.02	0.14	0.15	0.15
Pup checks in	-0.14	0.17	-0.13	0.28**	0.05
Pup responds to name	-0.02	0.24*	0.01	0.25*	0.19
Pup taking responsibility during follow me	-0.21	0.06	0.09	0.32**	0.05
Raiser's use of you	-0.13	0.16	0.07	0.21*	0.19
Raiser provides clear communication	0.00	0.28**	0.14	0.32**	0.15
Raiser gives food rewards properly	-0.09	0.15	0.03	0.23*	-0.05
Pup takes rewards properly	-0.19	0.01	0.10	0.22*	-0.12
Pup walks without pulling	-0.01	0.12	0.17	0.28**	0.14
Raiser keeps a loose leash	-0.04	0.20*	0.19	0.21*	0.18
Repeated positive experiences	-0.15	0.11	0.06	0.17	0.00
Pup settles	-0.16	0.06	0.01	0.22*	-0.02
Pup left alone uncrated	-0.05	0.19	0.13	0.38**	0.10
Raiser uses skills to direct	-0.05	0.23*	0.11	0.25*	0.10
Raising progressing skills	-0.03	0.26*	0.13	0.23*	0.16
Pup at appropriate skill level	-0.03	0.22*	0.15	0.24*	0.15
N	98	98	98	98	98
Relationship skills	-0.13	0.23*	0.14	0.37**	0.13

** = <0.01, * = <0.05, items that remain significant after using Bonferroni corrections are printed in bold typeface

Table 13. Reliability of codings and ratings from the Figure-8 exercise. Numbers represent intra-class correlation coefficients (ICCs). Average calculated using Fisher's r to z transformation.

	Type	4- month	8- month	13- month
Total time	Coding	0.99	0.92	0.94
Sit time	Coding	0.50	0.96	0.99
Down time	Coding	0.61	0.88	0.94
Distraction	Coding	0.78	0.66	0.31
Leash tension	Coding	0.59	0.51	0.55
Treats	Coding	0.89	0.96	0.85
Verbal praise	Coding	0.71	0.75	0.85
Commands	Coding	0.52	0.52	0.73
Dog focus	Rating	0.84	0.83	0.79
Raiser focus	Rating	0.49	0.65	0.62
Communication level	Rating	0.81	0.71	0.81
Communication quality	Rating	0.44	0.41	0.33
Dog energy	Rating	0.81	0.70	0.68
Human energy	Rating	0.70	0.61	0.61
Raiser-dog coordination	Rating	0.72	0.73	0.69
Relationship quality	Rating	0.75	0.67	0.65
Average		0.76	0.77	0.78

Table 14. Criterion validity correlations between factors from the Relationship Questionnaire and codings and ratings from the Figure-8 exercise at 4-months. Averages calculated using Fisher's r to z transformation.

	Anthropomorphism	Obedience	Closeness	Understanding of dog	Care of dog
Total time	-0.01	-0.02	0.07	-0.16	0.17
Sit time	-0.01	-0.16	-0.08	-0.10	-0.15
Down time	0.05	-0.04	0.07	-0.15	-0.36*
Distraction	-0.01	-0.11	-0.01	-0.11	0.04
Leash tension	-0.12	-0.19	-0.15	-0.11	0.01
Treats	-0.05	-0.16	0.05	-0.16	0.11
Verbal praise	-0.14	0.00	0.14	0.09	0.14
Commands	-0.09	-0.17	-0.08	-0.13	-0.22*
Dog focus	-0.08	0.30**	0.12	0.10	0.03
Raiser focus	-0.06	0.03	0.05	0.12	0.00
Communication level	-0.05	-0.09	0.00	0.03	-0.03
Communication quality	0.02	0.16	0.02	0.15	0.08
Dog energy	0.06	-0.16	-0.16	0.05	-0.18
Human energy	0.08	-0.07	-0.10	0.07	-0.09
Raiser-dog coordination	0.01	0.27**	0.09	0.12	0.07
Relationship quality	-0.03	0.22*	0.09	0.10	0.00
N	101	101	101	101	101
Average	-0.03	-0.01	0.01	-0.01	-0.03

** = <0.01, * = <0.05, items that remain significant after using Bonferroni corrections are printed in bold typeface

Table 15. Criterion validity correlations between factors from the Relationship Questionnaire and codings and ratings from the Figure-8 exercise at 8-months.

	Anthropomorphism	Obedience	Closeness	Understanding of dog	Care of dog
Total time	0.08	0.04	0.05	0.01	-0.05
Sit time	0.12	-0.01	-0.09	-0.13	-0.08
Down time	-0.04	0.16	0.06	0.09	-0.05
Distraction	-0.07	-0.05	0.05	-0.17	0.03
Leash tension	0.00	0.01	0.10	-0.15	0.01
Treats	-0.11	-0.15	0.04	-0.04	0.11
Verbal praise	-0.09	-0.01	0.12	-0.15	0.19
Commands	0.01	0.12	0.04	-0.20*	0.11
Dog focus	-0.06	-0.03	-0.05	0.09	-0.05
Raiser focus	0.12	0.05	-0.03	0.03	0.15
Communication level	0.14	-0.02	0.04	0.08	0.07
Communication quality	0.18	0.08	-0.03	0.19 ⁺	0.04
Dog energy	-0.06	-0.05	-0.09	-0.03	-0.06
Human energy	-0.06	-0.06	-0.08	0.06	-0.05
Raiser-dog coordination	0.00	0.01	-0.15	0.09	-0.10
Relationship quality	0.12	0.05	-0.07	0.16	0.01
N	97	97	97	97	97
Average	0.02	0.01	-0.01	0.00	0.02

** = <0.01, * = <0.05, None of the findings in this table remained significant after making Bonferroni corrections.

Table 16. Criterion validity correlations between factors from the Relationship Questionnaire and codings and ratings from the Figure-8 exercise at 13-months.

	Anthropomorphism	Obedience	Closeness	Understanding of dog	Care of dog
Total time	-0.13	-0.04	-0.08	-0.23*	-0.04
Sit time	-0.02	-0.08	-0.02	-0.14	0.01
Down time	-0.05	-0.04	0.10	-0.18	-0.05
Distraction	-0.22*	-0.14	-0.12	-0.11	0.09
Leash tension	-0.25**	-0.25**	-0.22*	-0.13	-0.01
Treats	-0.20*	-0.05	-0.12	-0.19*	-0.19
Verbal praise	-0.09	-0.08	-0.15	-0.02	0.02
Commands	-0.07	-0.08	-0.26**	0.01	-0.14
Dog focus	0.27**	0.21*	0.06	0.20*	-0.07
Raiser focus	0.09	0.18*	0.04	0.12	-0.06
Communication level	0.06	-0.02	-0.08	-0.14	-0.02
Communication quality	0.12	0.11	0.04	0.27**	0.01
Dog energy	0.03	-0.12	-0.07	0.04	0.09
Human energy	0.10	0.00	0.07	0.12	-0.01
Raiser-dog coordination	0.20*	0.16	0.06	0.17*	0.03
Relationship quality	0.23*	0.12	0.03	0.23*	-0.03
N	106	106	106	106	106
Average	0.00	-0.01	-0.05	0.00	-0.02

** = <0.01, * = <0.05, none of the findings in this table remained significant after making Bonferroni corrections.

Table 17. Descriptive statistics of the GEB puppy raisers and their dogs in the study for dogs at their 4-month walk-and-talk.

	Mean	Standard deviation
Percentage of handling dog	94.09%	19.58%
Number of co-raisers	0.53	0.81
Age of participant	45.05	16.47
Age of dog	4.86	1.00
Number of previous GEB dogs raised	2.73	3.23
	Number	Percentage
Do you co-raise your dog with anyone else?		
Yes	52	39.7%
No	79	60.3%
Participant gender		
Male	11	8.4%
Female	120	91.6%
Sex of dog		
Male	66	50.4%
Female	64	48.9%
Breed of dog		
German Shepherd	9	6.9%
Lab/Golden	2	1.5%
Labrador Retriever	120	91.6%
Are you planning on raising another guide dog puppy?		
Yes	82	62.6%
No	3	2.3%
Unsure	44	33.6%
Which of the following would you say your relationship with your dog is most like?		
Brother/sister	1	0.8%
Mentor/advisee	27	20.6%
Parent/child	93	71.0%
Other	8	6.1%

Table 18. Descriptive statistics of the GEB puppy raisers and their dogs in the study for dogs at their 8-month walk-and-talk.

	Mean	Standard deviation
Percentage of handling dog	95.19%	15.67%
Number of co-raisers	1.34	0.73
Age of participant	48.25	15.37
Age of dog	8.89	1.41
Number of previous GEB dogs raised	3.07	3.17
	Number	Percentage
Do you co-raise your dog with anyone else?		
Yes	48	40.0%
No	72	60.0%
Participant gender		
Male	12	9.9%
Female	109	90.1%
Sex of dog		
Male	62	51.7%
Female	58	48.3%
Breed of dog		
German Shepherd	7	5.8%
Lab/Golden	1	0.8%
Labrador Retriever	113	93.4%
Are you planning on raising another guide dog puppy?		
Yes	90	73.2%
No	2	1.6%
Unsure	31	25.2%
Which of the following would you say your relationship with your dog is most like?		
Brother/sister	1	0.8%
Husband/wife	1	0.8%
Mentor/advisee	28	22.8%
Parent/child	82	66.7%
Other	11	8.9%

Table 19. Descriptive statistics of the GEB puppy raisers and their dogs in the study for dogs at their 13-month walk-and-talk.

	Mean	Standard deviation
Percentage of handling dog	96.69%	15.13
Number of co-raisers	1.29	0.67
Age of participant	46.30	16.46
Age of dog	13.76	1.77
Number of previous GEB dogs raised	2.13	3.48
	Number	Percentage
Do you co-raise your dog with anyone else?		
Yes	52	38.8%
No	82	61.2%
Participant gender		
Male	16	11.9%
Female	119	88.1%
Sex of dog		
Male	69	50.7%
Female	67	49.3%
Breed of dog		
German Shepherd	6	4.5%
Lab/Golden	2	1.5%
Labrador Retriever	124	92.5%
Are you planning on raising another guide dog puppy?		
Yes	101	73.2%
No	4	2.9%
Unsure	33	23.9%
Which of the following would you say your relationship with your dog is most like?		
Brother/sister	5	3.6%
Mentor/advisee	24	17.4%
Parent/child	91	65.9%
Other	18	13.0%

Table 20. Human characteristics that influence relationship factors at 4-months. Numbers represent standardized betas.

	Anthropomorphism	Obedience	Closeness	Understanding of dog	Care of dog	Alpha
Extraversion	-0.04	0.15	0.05	-0.07	0.00	0.87
Agreeableness	0.20*	-0.06	0.19	-0.07	0.07	0.81
Conscientiousness	0.00	0.28**	0.04	-0.02	0.27*	0.80
Neuroticism	0.23*	-0.20*	-0.10	-0.40**	-0.10	0.82
Openness	0.04	0.15	0.24**	0.00	0.16	0.84
Participant age	-0.39**	-0.30**	-0.18	-0.23*	-0.04	NA
Previous dogs	0.17	0.40**	0.04	0.38**	0.01	NA
R^2	0.18	0.29	0.16	0.27	0.16	

** = <0.01, * = <0.05

Table 21. Dog characteristics at 6 and 12-months that influence relationship factors at 4-months. Numbers represent standardized betas.

	<u>Anthropomorphism</u>		<u>Obedience</u>		<u>Closeness</u>		<u>Understanding of dog</u>		<u>Care of dog</u>		<u>Alpha</u>	
	6-month	12-month	6-month	12-month	6-month	12-month	6-month	12-month	6-month	12-month	6-month	12-month
Stranger-directed aggression	-0.05	0.05	-0.03	0.14	-0.14	-0.23	0.04	0.19	0.13	0.69*	0.73	0.86
Owner-directed aggression	0.09	-0.02	-0.15	-0.12	-0.22	-0.70*	-0.06	0.25	0.18	-0.57	0.43	0.70
Dog-directed aggression	-0.01	0.05	0.02	0.01	0.03	-0.26	-0.10	-0.16	0.11	-0.16	0.57	0.86
Familiar-dog aggression	-0.07	0.23	-0.16	0.21	-0.06	-0.19	-0.07	-0.05	-0.19	0.02	0.43	0.26
Trainability	0.06	0.15	0.32**	0.07	0.08	-0.12	0.06	-0.07	0.23*	0.15	0.58	0.75
Chasing	0.03	-0.18	-0.06	-0.03	0.11	-0.01	-0.16	-0.20	0.26*	0.23	0.81	0.78
Stranger-directed fear	-0.02	-0.27	0.01	-0.37	0.08	-0.36	0.13	-0.38	0.06	0.74**	0.76	0.61
Nonsocial fear	0.13	0.15	0.02	-0.08	0.08	-0.03	0.13	-0.19	0.08	0.04	0.69	0.70
Separation related problems	-0.16	0.24	-0.10	-0.19	-0.05	0.20	-0.11	-0.08	-0.02	-0.24	0.69	0.55
Pain sensitivity	0.10	0.12	-0.13	-0.15	0.19	-0.28	-0.11	-0.03	-0.18	0.18	0.73	0.72
Excitability	0.08	0.02	0.08	-0.01	-0.09	-0.13	0.17	0.17	-0.14	-0.25	0.86	0.80
Attachment	0.26*	0.10	-0.03	-0.27	0.29*	0.42*	-0.28*	-0.19	-0.14	0.03	0.70	0.49
R^2	0.12	0.21	0.33	0.48	0.12	0.37	0.28	0.43	0.20	0.44		

** = <0.01, * = <0.05

Table 22. Dog characteristics from the BCL that influence relationship factors at 4-months. Numbers represent standardized betas.

	<u>Anthropomorphism</u>		<u>Obedience</u>		<u>Closeness</u>		<u>Understanding of dog</u>		<u>Care of dog</u>		<u>Alpha</u>	
	2-month	4-month	2-month	4-month	2-month	4-month	2-month	4-month	2-month	4-month	2-month	4-month
Calmness/Composure	0.11	-0.13	-0.06	0.02	0.01	0.08	-0.02	-0.07	0.14	-0.04	0.69	0.79
Focus	-0.01	0.10	-0.18	-0.06	-0.06	-0.16	-0.05	0.08	-0.14	0.10	0.42	0.23
Environmental Soundness	0.20 ⁺	-0.12	0.18	-0.06	0.20 ⁺	-0.02	-0.05	0.12	0.14	-0.22 [*]	0.00	0.38
Body Sensitivity	-0.11	0.16	-0.06	0.02	0.03	-0.10	-0.02	0.00	-0.04	0.23	-0.31	0.42
Comparison rating	0.04	0.02	-0.05	0.04	-0.17	0.10	0.07	0.03	-0.17	0.09	NA	NA
Consistency	0.04	0.08	-0.03	-0.04	0.18	-0.10	-0.10	-0.10	0.10	0.11	NA	NA
R^2	0.07	0.05	0.07	0.01	0.05	0.04	0.02	0.04	0.07	0.07		

^{**} = <0.01, ^{*} = <0.05

Table 23. Human characteristics that influence relationship factors at 8-months. Numbers represent standardized betas.

	Anthropomorphism	Obedience	Closeness	Understanding of dog	Care of dog	Alpha
Extraversion	0.28**	-0.12	0.07	0.12	0.01	0.89
Agreeableness	-0.06	0.07	0.04	-0.08	0.05	0.84
Conscientiousness	0.24*	0.22*	0.11	-0.08	0.21	0.79
Neuroticism	0.17	-0.10	-0.04	0.08	0.10	0.74
Openness	0.00	0.03	-0.04	-0.12	0.28**	0.80
Participant age	-0.17	-0.20	0.28**	0.09	-0.01	NA
Previous dogs	-0.10	0.11	-0.15	0.21*	-0.01	NA
R^2	0.17	0.12	0.11	0.11	0.15	

** = <0.01, * = <0.05

Table 24. Dog characteristics from the CBARQ that influence relationship factors at 8-months. Numbers represent standardized betas. 12-month estimates are listed in parenthesis.

	<u>Anthropomorphism</u>		<u>Obedience</u>		<u>Closeness</u>		<u>Understanding of dog</u>		<u>Care of dog</u>		<u>Alpha</u>	
	6-month	12-month	6-month	12-month	6-month	12-month	6-month	12-month	6-month	12-month	6-month	12-month
Stranger-directed aggression	0.08	-0.09	-0.02	-0.18	0.01	0.45**	0.04	-0.01	0.00	0.15	0.01	0.78
Owner-directed aggression	-0.02	-0.32*	-0.03	-0.12	-0.03	-0.06	-0.08	-0.38*	-0.03	0.12	0.33	0.41
Dog-directed aggression	-0.33*	-0.08	-0.20	0.19	0.16	-0.01	0.01	0.10	0.13	-0.03	0.79	0.60
Familiar-dog aggression	-0.06	0.31	-0.12	0.15	0.01	-0.06	0.08	0.13	-0.03	-0.19	0.32	0.30
Trainability	-0.07	0.15	0.16	0.33*	0.25*	0.06	-0.06	-0.12	-0.14	-0.20	0.62	0.62
Chasing	-0.07	0.05	0.06	0.12	0.11	0.11	0.04	-0.11	0.19	0.13	0.76	0.76
Stranger-directed fear	0.02	0.10	-0.05	0.08	0.10	-0.06	-0.12	-0.02	0.00	-0.10	0.58	0.87
Nonsocial fear	-0.01	0.00	-0.28*	-0.30	0.10	-0.05	0.14	-0.01	0.14	-0.17	0.60	0.59
Separation related problems	-0.06	0.15	-0.14	0.11	-0.13	-0.08	-0.03	-0.04	-0.19	0.35*	0.58	0.63
Pain sensitivity	0.06	-0.09	0.15	0.10	-0.08	-0.01	-0.02	0.00	-0.04	-0.07	0.65	0.65
Excitability	0.12	-0.22	0.01	0.03	-0.16	-0.02	-0.13	-0.04	-0.14	-0.17	0.91	0.79
Attachment	0.27*	0.29*	0.21	0.23	-0.07	-0.18	-0.43**	-0.41**	0.14	0.14	0.63	0.64
R^2	0.13	0.22	0.18	0.33	0.14	0.21	0.27	0.31	0.13	0.20		

** = <0.01, * = <0.05

Table 25. Dog characteristics from the BCL that influence relationship factors at 8-months. Numbers represent standardized betas.

	<u>Anthropomorphism</u>		<u>Obedience</u>		<u>Closeness</u>		<u>Understanding of dog</u>		<u>Care of dog</u>		<u>Alpha</u>	
	2-month	8-month	2-month	8-month	2-month	8-month	2-month	8-month	2-month	8-month	2-month	8-month
Calmness/Composure	0.02	-0.01	-0.08	-0.05	0.07	0.15	-0.02	0.24*	0.07	-0.05	0.66	0.81
Focus	0.10	-0.12	-0.20	-0.20	-0.08	0.11	-0.05	0.16	0.07	-0.33**	0.44	0.41
Environmental Soundness	0.29**	0.07	0.10	0.12	-0.20	-0.05	-0.05	-0.03	0.00	-0.03	0.67	0.19
Body Sensitivity	0.04	-0.03	-0.01	0.06	-0.08	-0.04	-0.02	-0.09	-0.07	0.09	-0.16	0.24
Comparison rating	-0.11	0.13	-0.17	0.12	0.01	-0.32*	0.07	0.01	-0.12	0.17	NA	NA
Consistency	0.05	-0.18	0.12	-0.24	-0.02	0.04	-0.10	0.05	0.20	0.13	NA	NA
R^2	0.08	0.05	0.07	0.13	0.06	0.08	0.05	0.12	0.05	0.09		

** = <0.01, * = <0.05

Table 26. Human characteristics that influence relationship factors at 13-months. Numbers represent standardized betas.

	Anthropomorphism	Obedience	Closeness	Understanding of dog	Care of dog	Alpha
Extraversion	0.25*	0.12	0.14	0.01	0.04	0.87
Agreeableness	-0.11	0.13	0.13	0.08	-0.01	0.78
Conscientiousness	0.21*	0.08	0.12	0.19	0.04	0.78
Neuroticism	0.04	-0.09	0.13	0.08	-0.05	0.75
Openness	-0.04	0.07	0.03	-0.07	0.08	0.76
Participant age	-0.19	-0.25*	-0.01	0.09	0.07	NA
Previous dogs	-0.12	0.13	-0.02	0.09	-0.02	NA
R^2	0.15	0.16	0.07	0.12	0.02	

** = <0.01, * = <0.05

Table 27. Dog characteristics from the CBARQ that influence relationship factors at 13-months. Numbers represent standardized betas. 12-month estimates are listed in parenthesis.

	<u>Anthropomorphism</u>		<u>Obedience</u>		<u>Closeness</u>		<u>Understanding of dog</u>		<u>Care of dog</u>		<u>Alpha</u>	
	6-month	12-month	6-month	12-month	6-month	12-month	6-month	12-month	6-month	12-month	6-month	12-month
Stranger-directed aggression	0.03	0.12	0.10	0.07	0.07	0.01	-0.14	0.15	0.04	0.17	0.61	0.74
Owner-directed aggression	-0.04	0.06	-0.04	0.04	-0.02	0.04	-0.15	0.02	0.10	-0.07	0.07	0.42
Dog-directed aggression	-0.09	-0.11	-0.07	0.12	-0.23	0.02	0.04	-0.24	-0.26*	0.23	0.84	0.74
Familiar-dog aggression	0.04	-0.15	0.01	-0.21	0.10	0.00	0.08	0.05	0.06	-0.16	0.51	0.51
Trainability	-0.01	-0.04	0.37**	-0.07	0.33**	-0.05	0.10	0.04	0.10	0.00	0.55	0.59
Chasing	0.15	0.06	0.12	-0.01	0.08	0.05	0.09	0.07	0.29**	-0.10	0.74	0.74
Stranger-directed fear	-0.04	0.04	-0.05	-0.09	-0.19	0.03	-0.02	0.11	0.08	-0.03	0.65	0.44
Nonsocial fear	-0.12	0.01	-0.18	-0.09	-0.13	-0.11	0.01	0.10	0.02	0.05	0.63	0.67
Separation related problems	0.16	-0.09	0.02	-0.18	0.00	0.06	-0.25*	0.13	0.02	-0.25*	0.60	0.55
Pain sensitivity	-0.05	0.09	-0.07	0.02	-0.18	-0.03	0.02	-0.17	0.11	0.08	0.70	0.58
Excitability	0.11	-0.16	-0.10	-0.01	-0.01	-0.03	-0.19	0.03	-0.20	-0.28**	0.91	0.76
Attachment	0.11	-0.18	0.12	-0.20	-0.01	0.03	-0.13	0.02	0.06	0.12	0.61	0.56
R^2	0.08	0.10	0.22	0.10	0.17	0.02	0.23	0.07	0.13	0.17		

** = <0.01, * = <0.05

Table 28. Dog characteristics from the BCL that influence relationship factors at 13-months. Numbers represent standardized betas.

	<u>Anthropomorphism</u>		<u>Obedience</u>		<u>Closeness</u>		<u>Understanding of dog</u>		<u>Care of dog</u>		<u>Alpha</u>	
	2-month	13-month	2-month	13-month	2-month	13-month	2-month	13-month	2-month	13-month	2-month	13-month
Calmness/Composure	-0.04	0.04	-0.06	0.06	-0.01	0.01	-0.11	0.16	-0.17	0.03	0.70	0.83
Focus	0.06	-0.10	-0.05	0.14	-0.01	0.01	0.08	0.15	-0.01	0.08	0.25	0.61
Environmental Soundness	0.23*	0.11	0.03	0.18	-0.08	0.16*	0.02	-0.03	0.01	0.07	0.20	0.77
Body Sensitivity	-0.01	0.00	0.00	0.11	-0.03	0.05	-0.04	0.19*	-0.14	0.06	0.13	0.05
Comparison rating	-0.14	-0.06	0.04	0.03	-0.01	-0.08	-0.08	0.16	-0.12	-0.04	NA	NA
Consistency	-0.11	-0.01	-0.18	-0.05	0.04	-0.02	-0.02	-0.21*	0.00	0.07	NA	NA
R^2	0.05	0.02	0.04	0.12	0.01	0.03	0.03	0.19	0.07	0.03		

** = <0.01, * = <0.05

Table 29. Summary of human and dog characteristics that predict relationship scores at each age. + represents a significant positive predictor, – represents a significant negative predictor. A cell left blank represents it is not a significant predictor. 4-mo = 4-months, 8-mo = 8-months, 13-mo = 13-months.

	<u>Anthropomorphism</u>			<u>Obedience</u>			<u>Closeness</u>			<u>Understanding of dog</u>			<u>Care of dog</u>		
	4- mo	8- mo	13- mo	4- mo	8- mo	13- mo	4- mo	8- mo	13- mo	4- mo	8- mo	13- mo	4- mo	8- mo	13- mo
Extraversion		+	+												
Agreeableness	+														
Conscientiousness		+	+	+	+								+		
Neuroticism	+			-						-				+	
Openness							+								
Participant age	-			-		-		+		-					
Previous dogs				+						+	+				
Stranger-directed aggression								+					+		
Owner-directed aggression		-					-				-				
Dog-directed aggression		-													-
Familiar-dog aggression															
Trainability				+	+	+		+	+				+		
Chasing													+		+
Stranger-directed fear													+		
Nonsocial fear					-										

Table 29 continued

Separation related problems												-		+	-
Pain sensitivity															
Excitability															+
Attachment	+	+					+			-	-/+				
Calmness/Composure											+				
Focus															
Environmental soundness		+	+						+				-	-	
Body sensitivity															
Comparison rating								-							
Consistency												-			

FIGURES

Figure 1. Scree plot of PCA conducted at 4-months for 91 items.

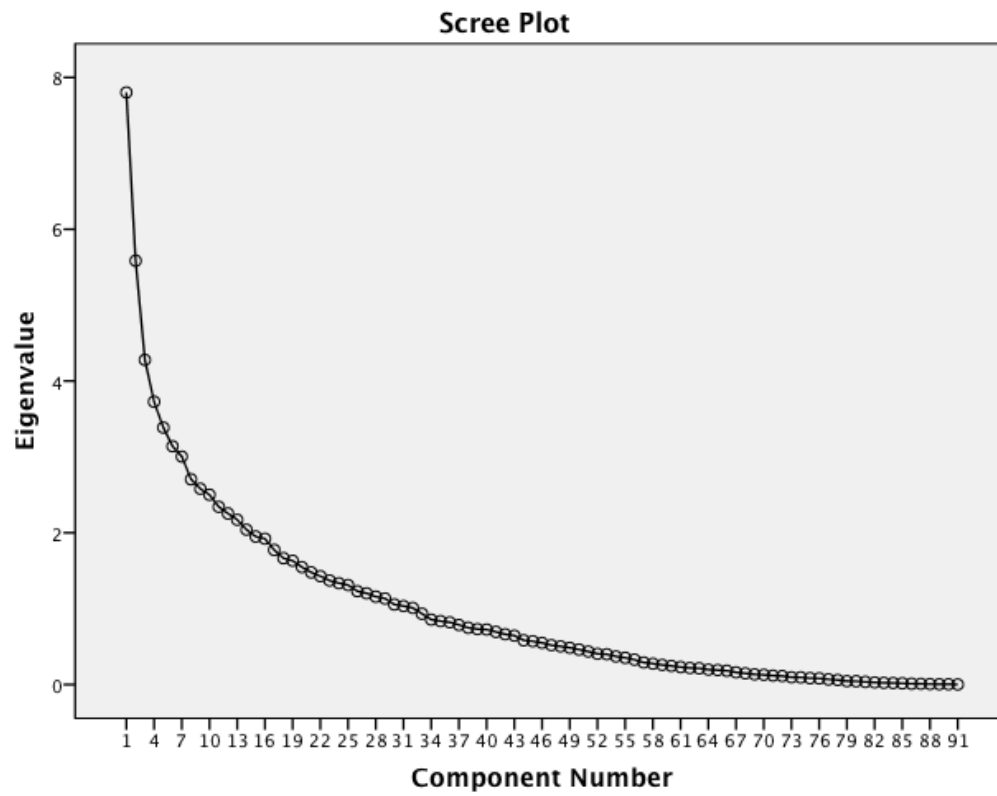


Figure 2. Parallel analysis of PCA conducted at 4-months for 91 items based on 1,000 replications.

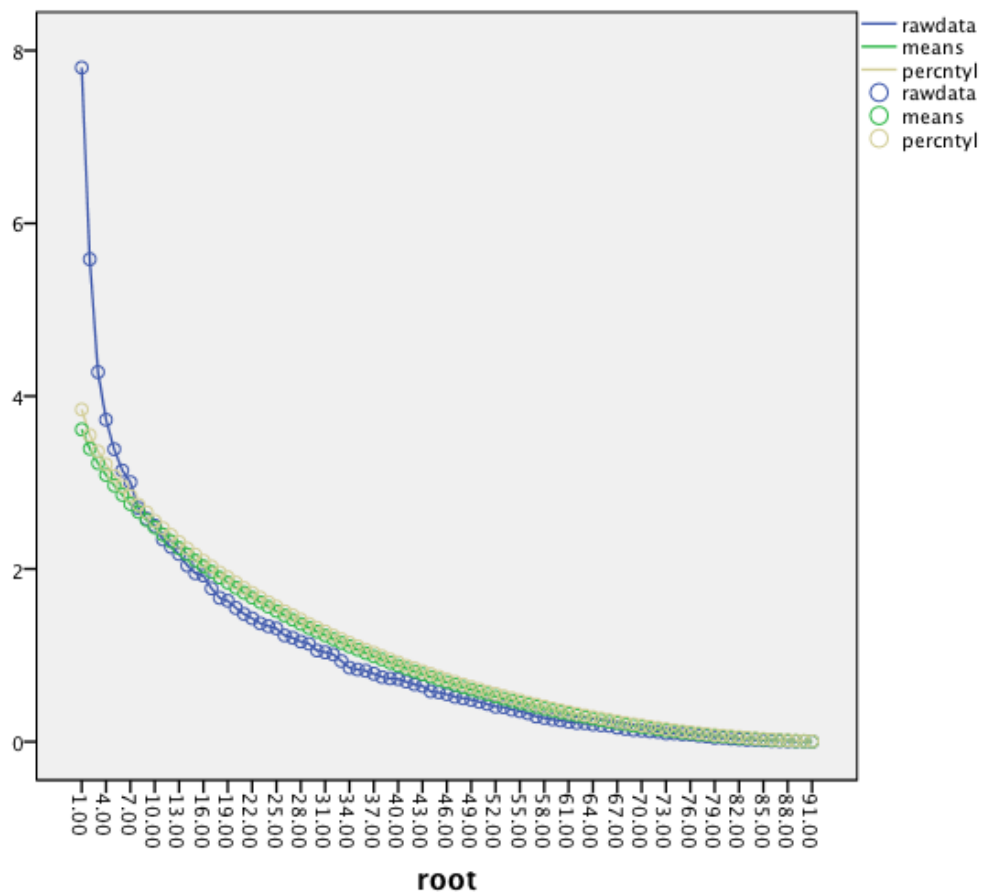


Figure 3. Bass Ackwards of PCA conducted at 4-months based on 91 items. Correlations above 0.50 are indicated.

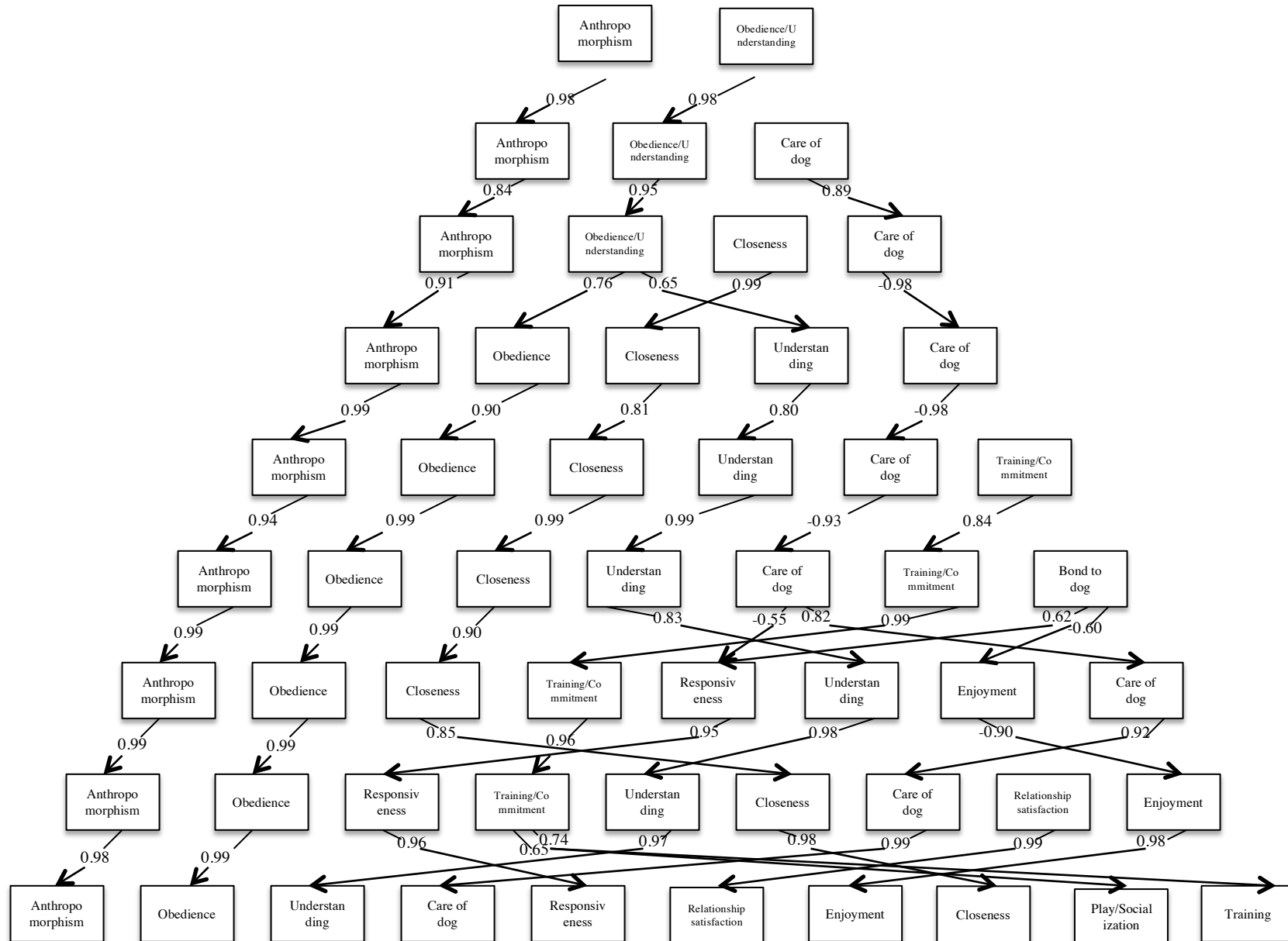


Figure 3 continued

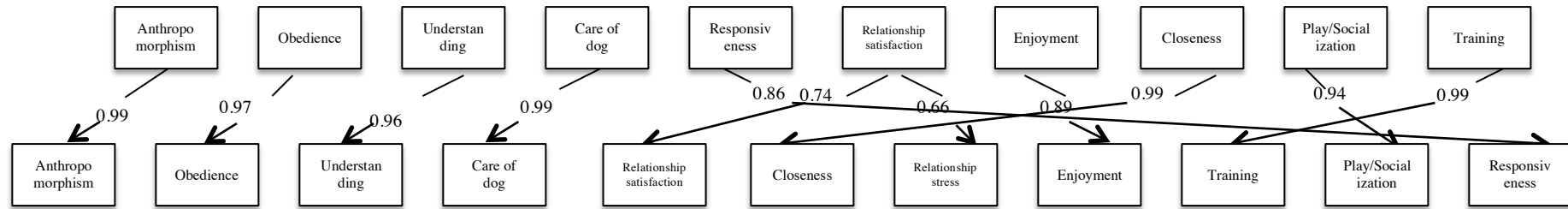


Figure 4. Scree plot of PCA conducted at 8-months for 91 items.

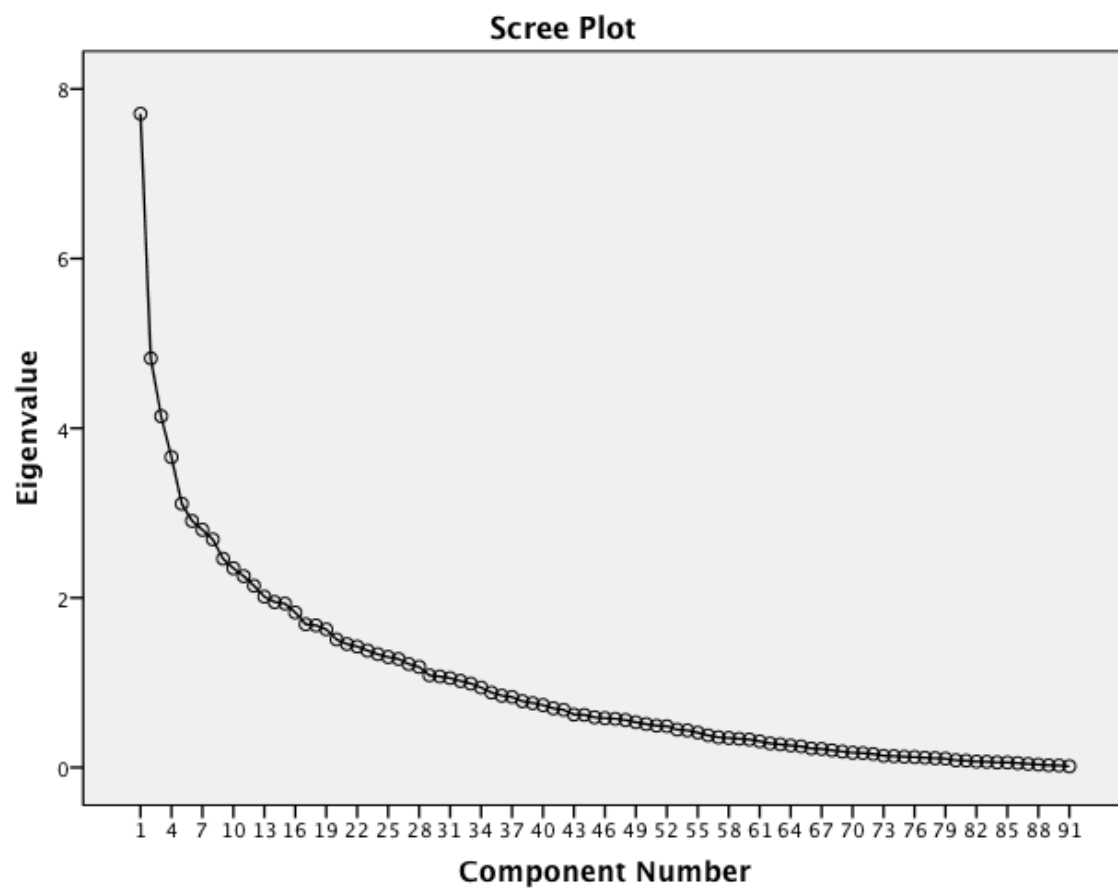


Figure 5. Parallel analysis of PCA conducted at 8-months for 91 items based on 1,000 replications.

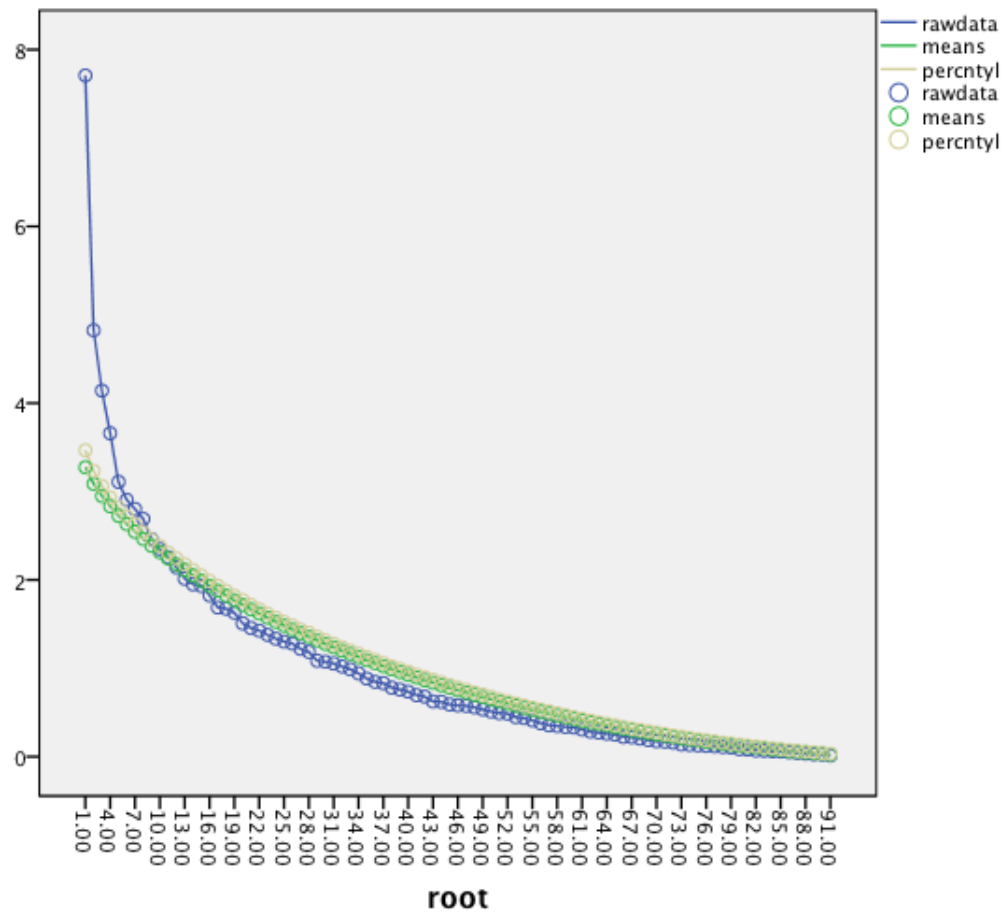


Figure 6. Bass Ackwards of PCA conducted at 8-months based on 91 items. Correlations above 0.50 are indicated.

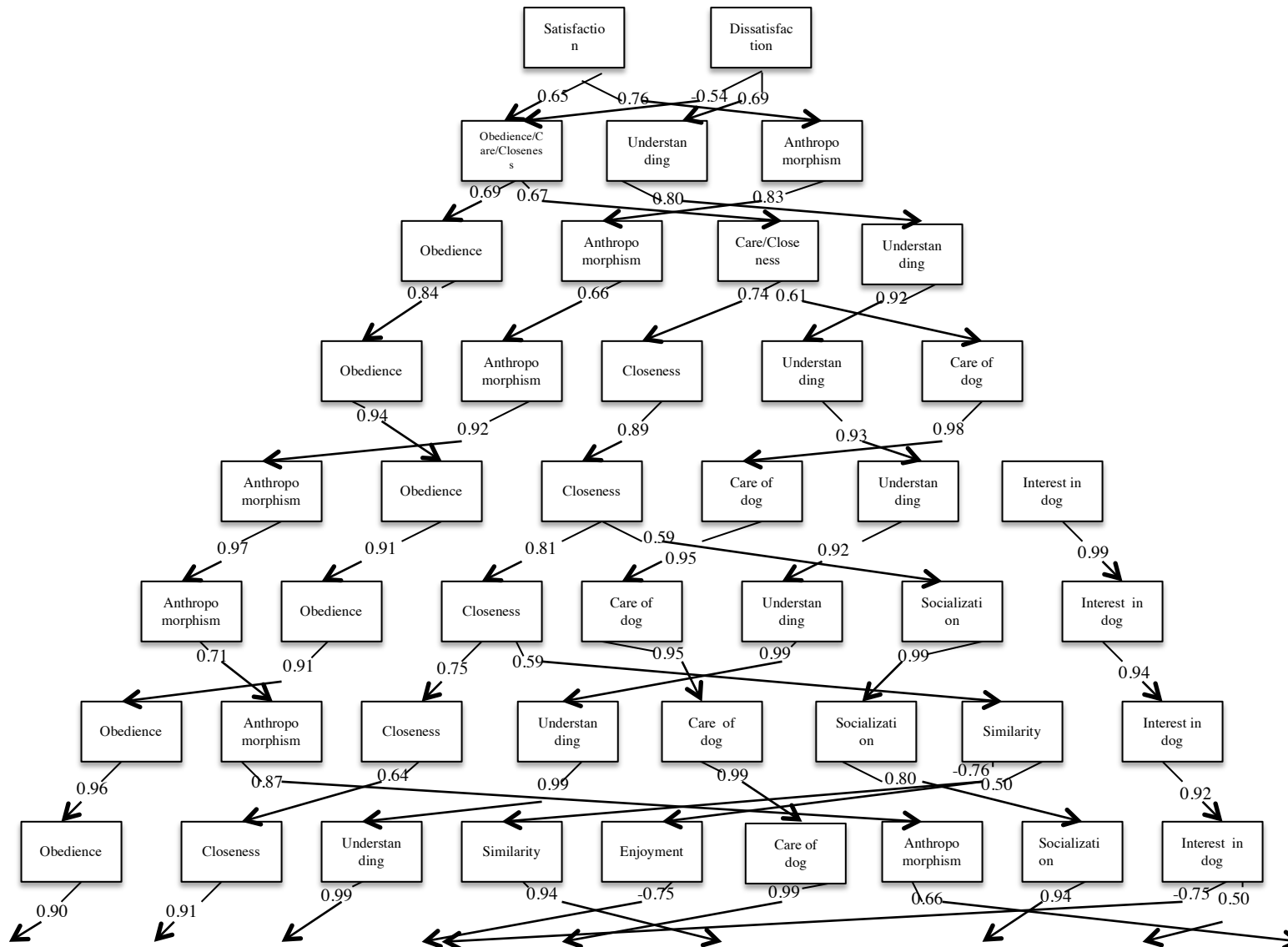


Figure 6 continued

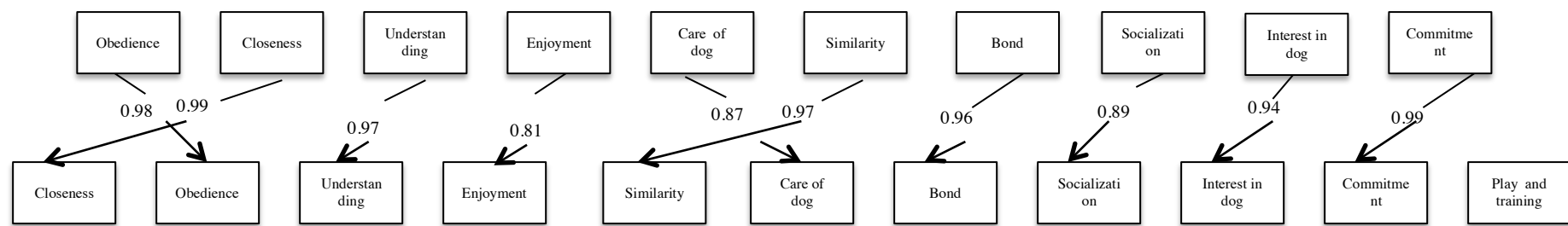


Figure 7. Scree plot of PCA conducted at 13-months for 91 items.

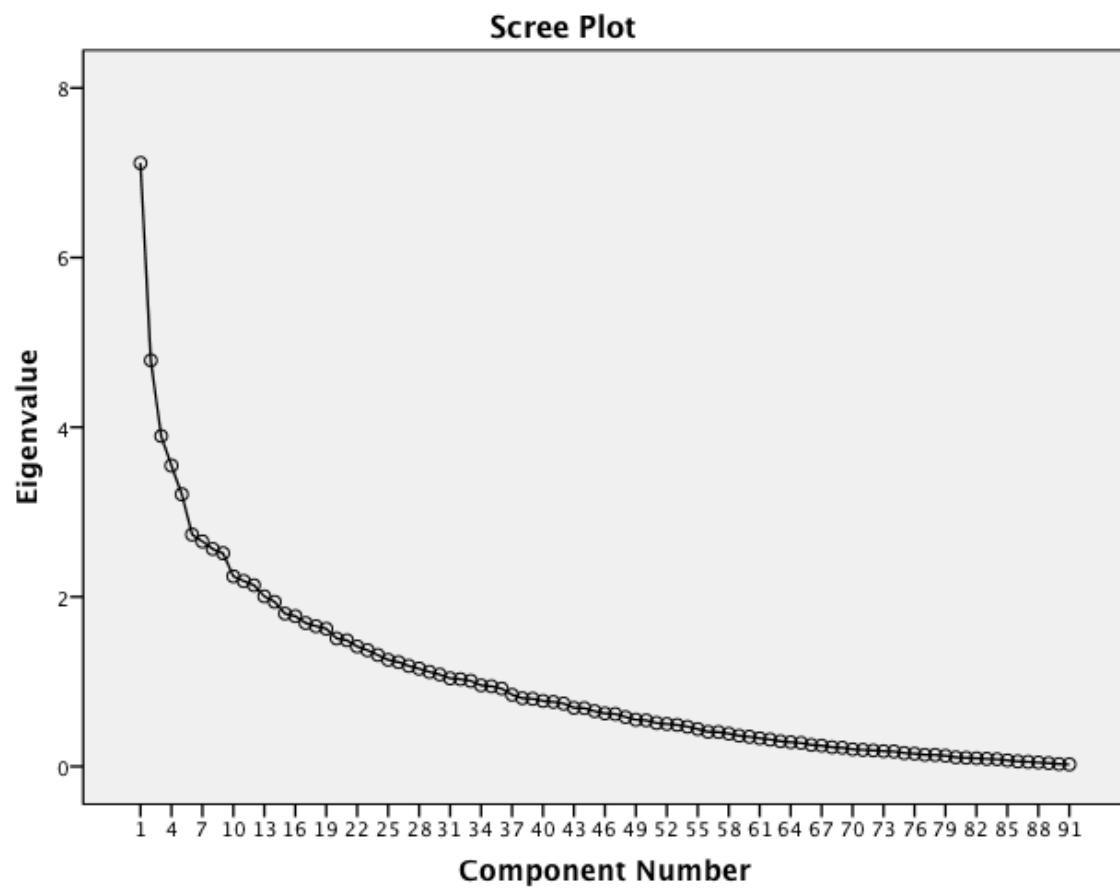


Figure 8. Parallel analysis of PCA conducted at 13-months for 91 items based on 1,000 replications.

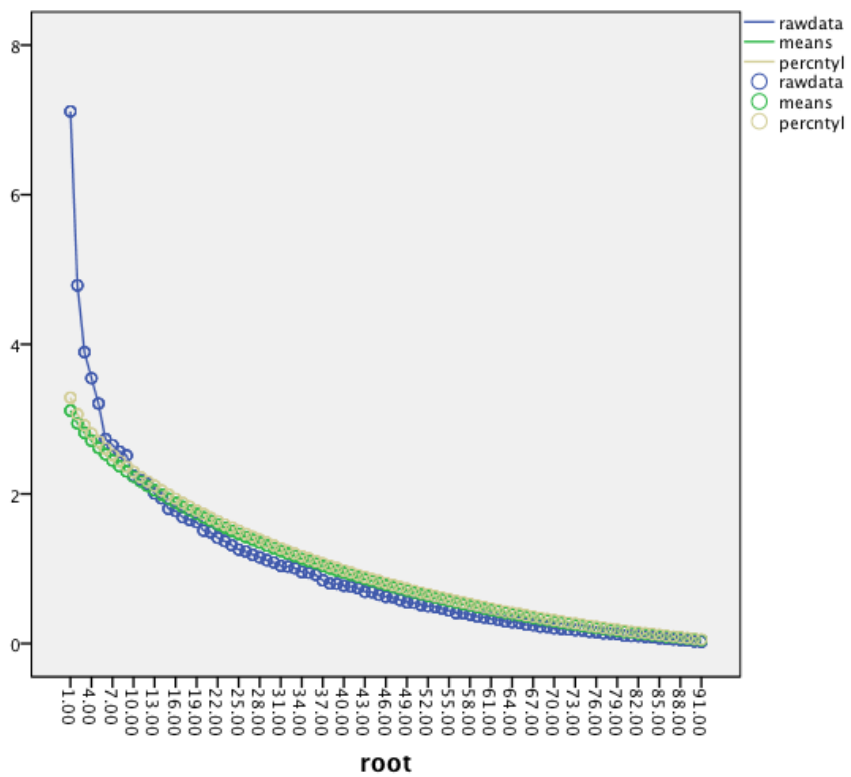


Figure 9. Bass Ackwards of PCA conducted at 13-months based on 91 items. Correlations above 0.50 are indicated.

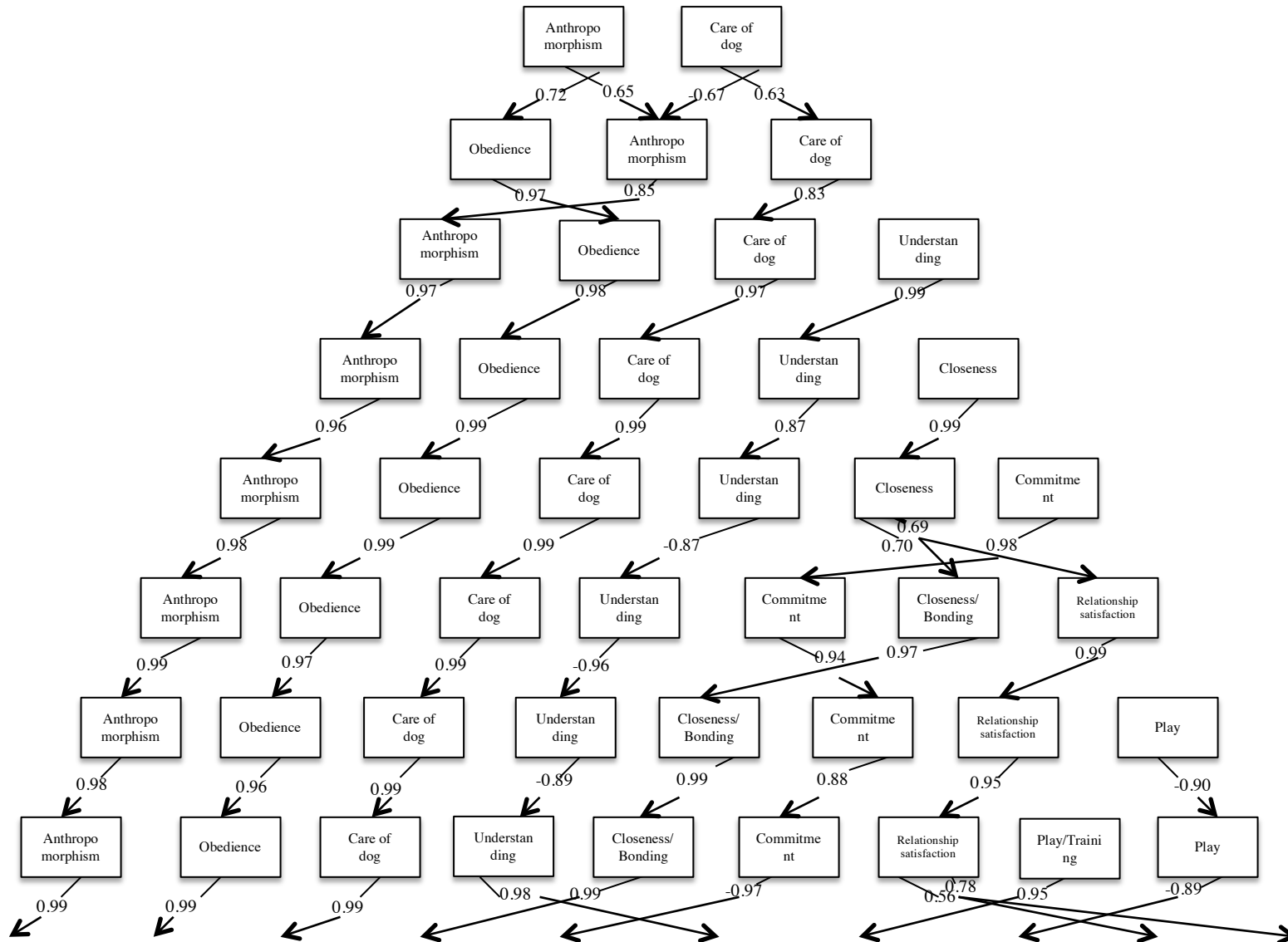


Figure 9 continued

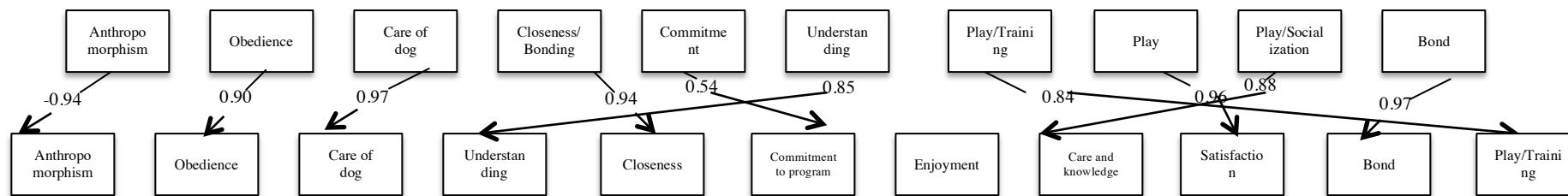


Figure 10. Scree plot of walk and talk item PCA conducted at 4-months for 17 items.

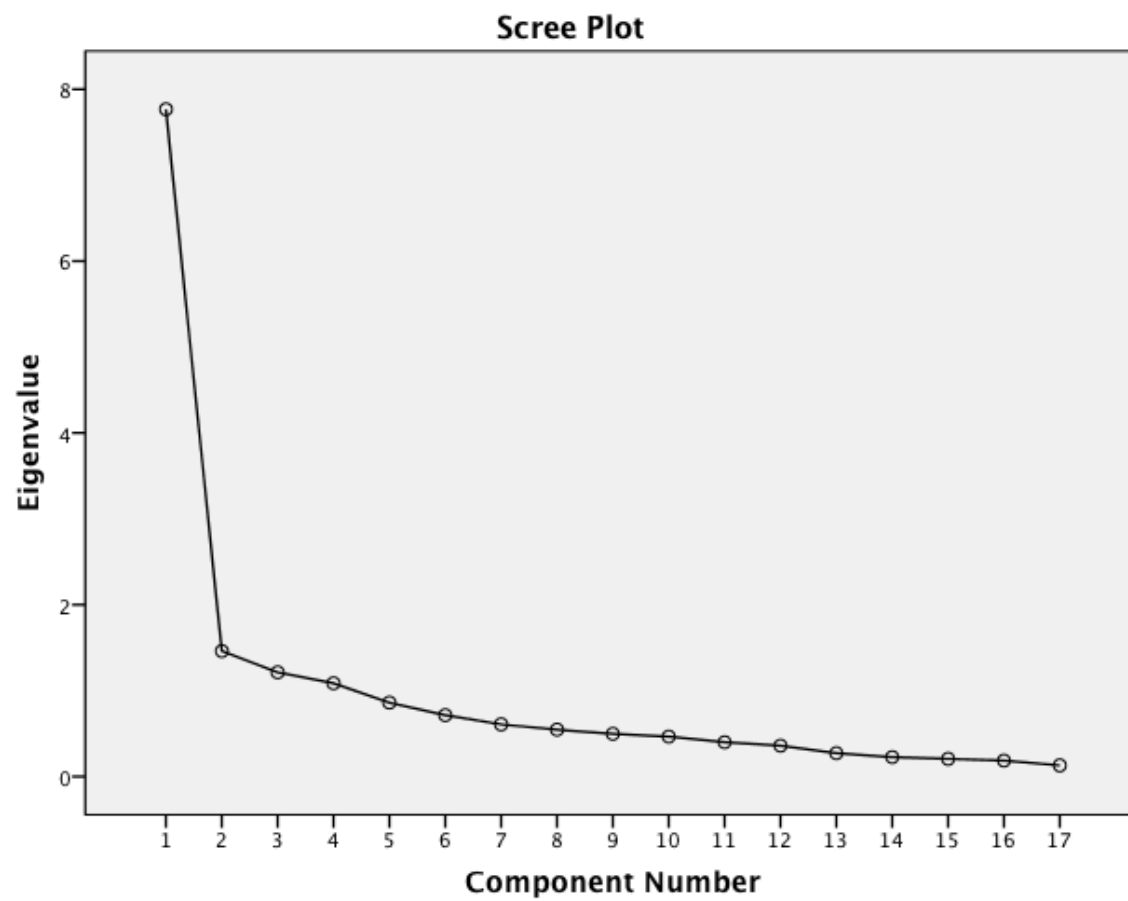


Figure 11. Parallel analysis of PCA conducted at 4-months for 17 items based on 1,000 replications.

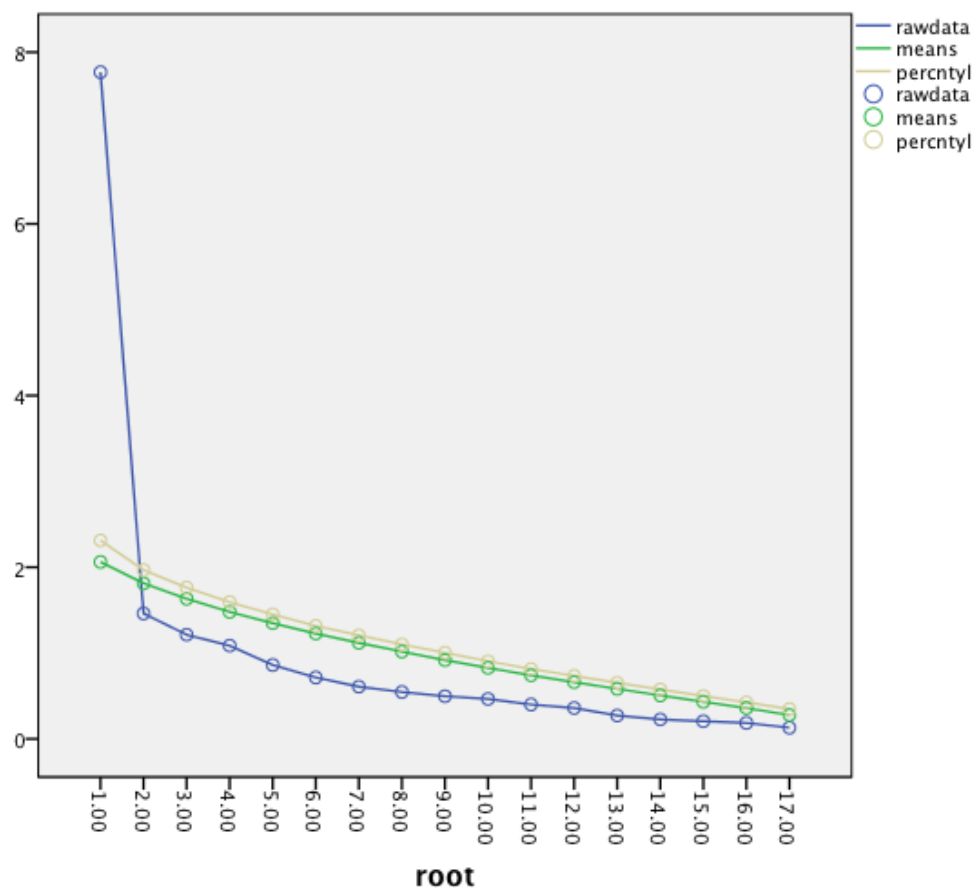


Figure 12. Bass Ackwards of PCA conducted at 4-months based on 17 items. Correlations above 0.50 are indicated.

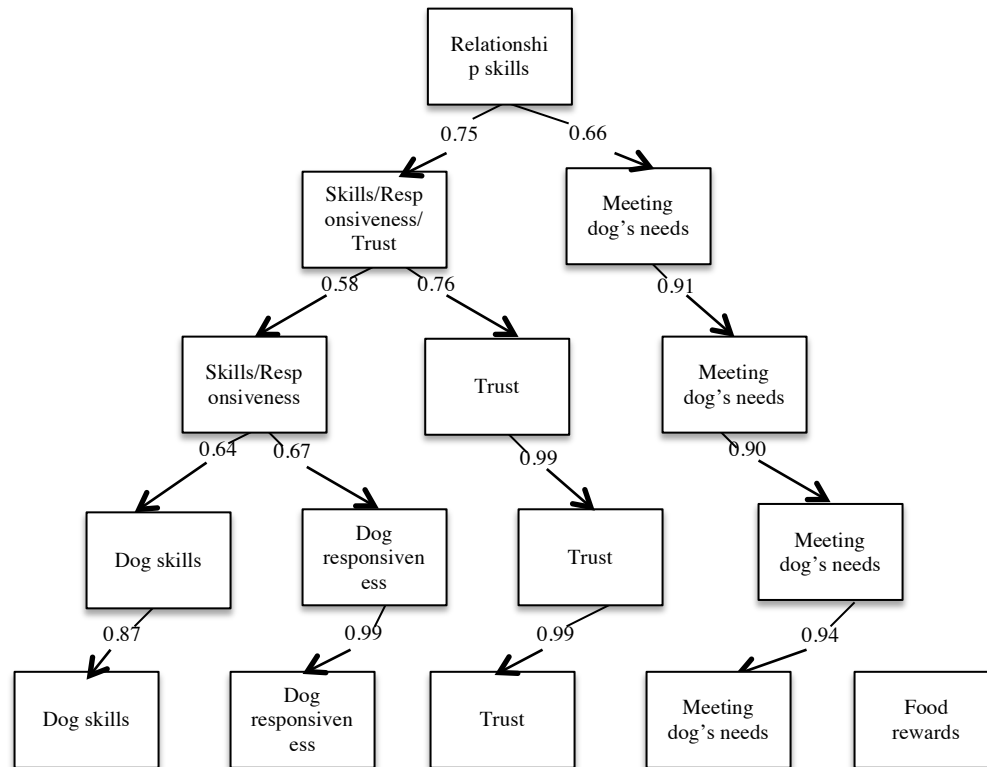


Figure 13. Scree plot of walk and talk item PCA conducted at 8-months for 17 items.

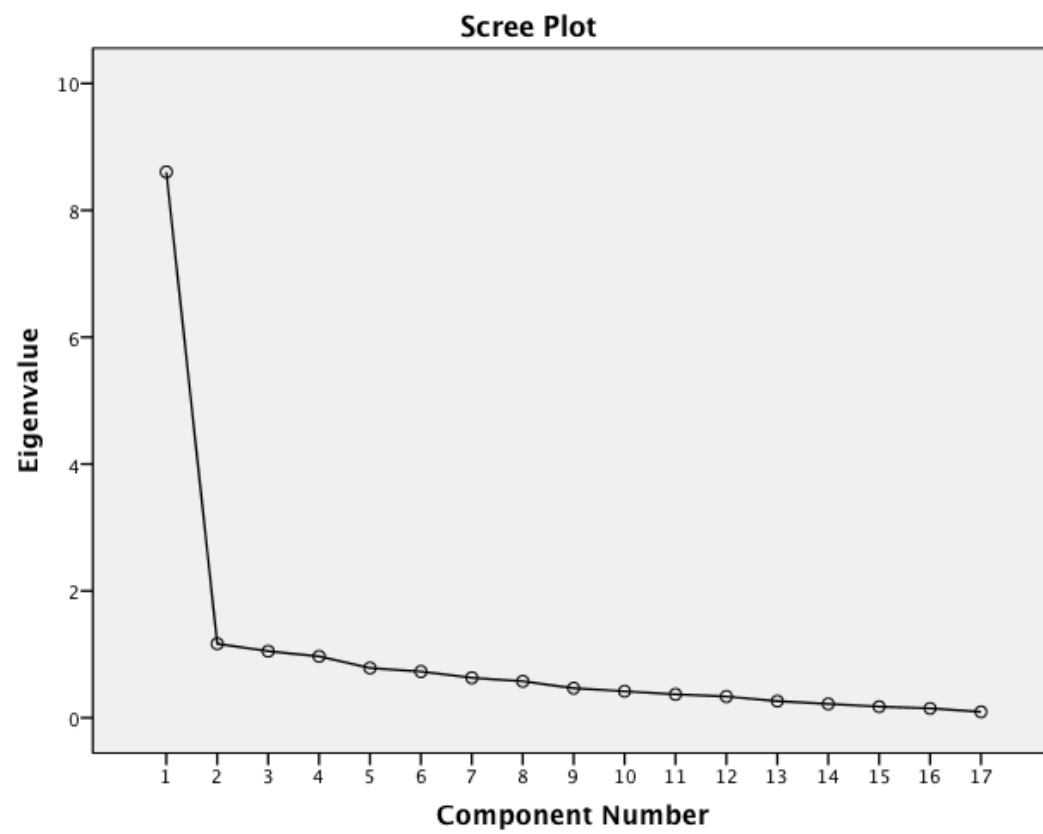


Figure 14. Parallel analysis of PCA conducted at 8-months for 17 items based on 1,000 replications.

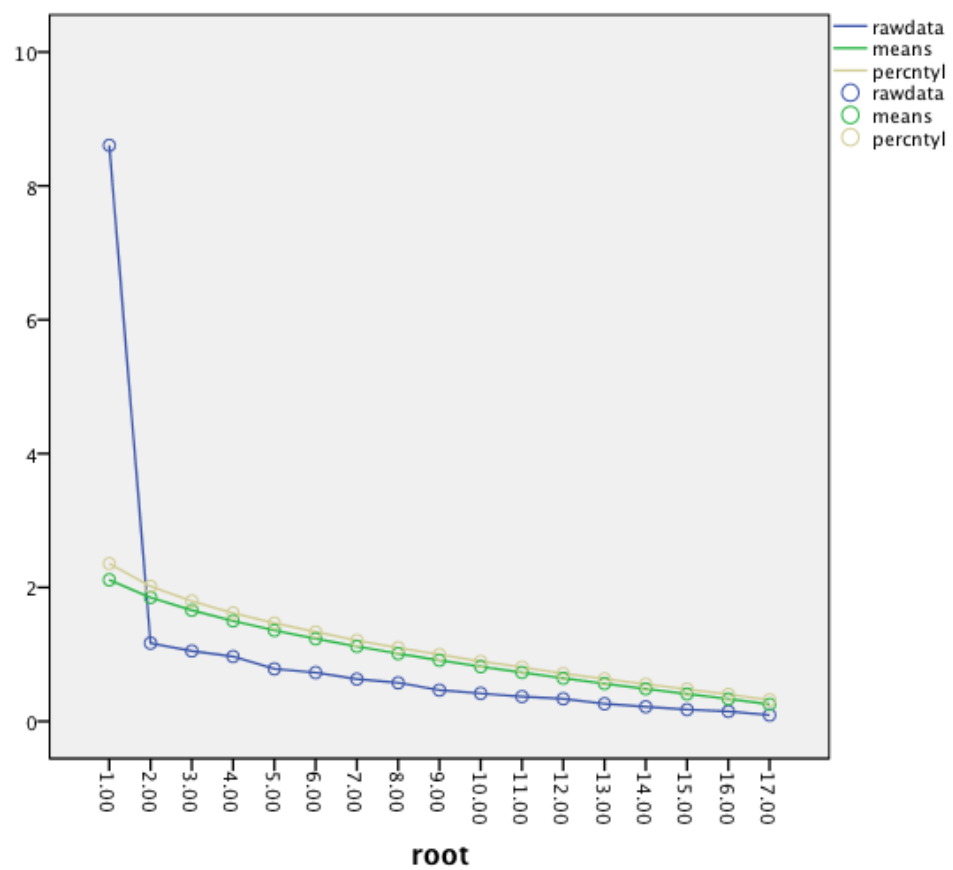


Figure 15. Bass Ackwards of PCA conducted at 8-months based on 17 items. Correlations above 0.50 are indicated.

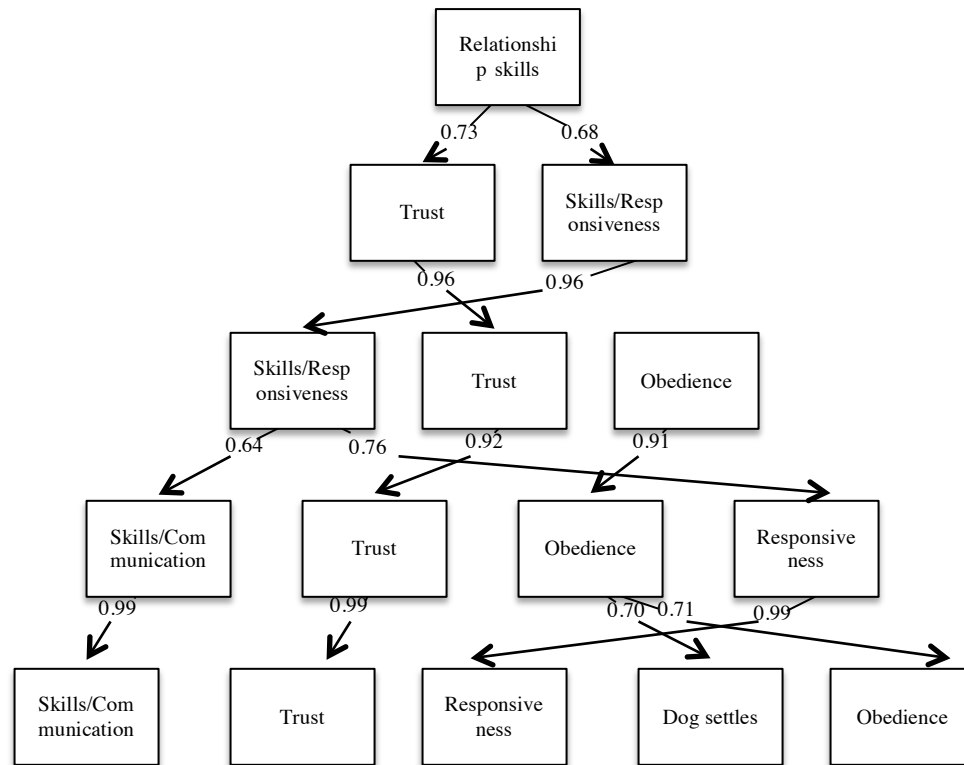


Figure 16. Scree plot of walk and talk item PCA conducted at 13-months for 17 items.

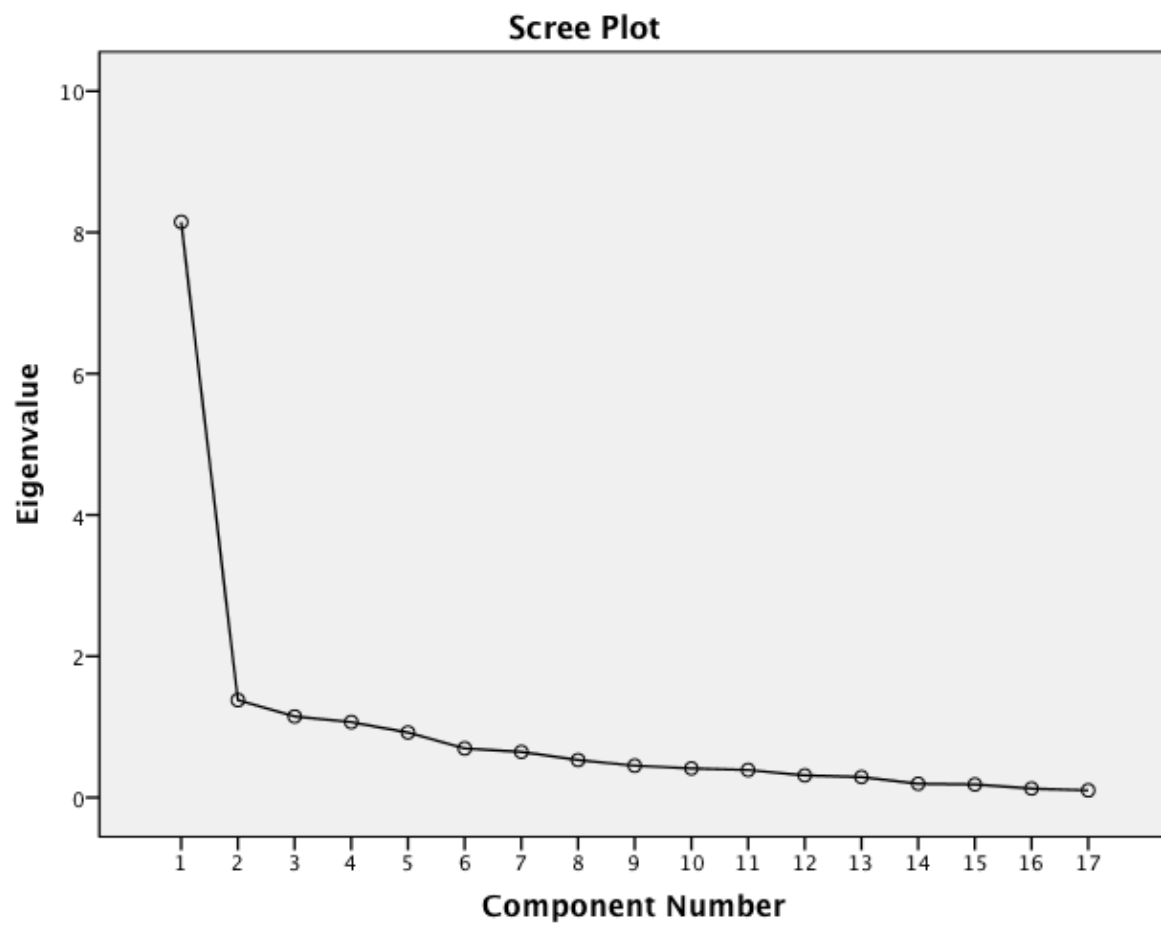


Figure 17. Parallel analysis of PCA conducted at 13-months for 17 items based on 1,000 replications.

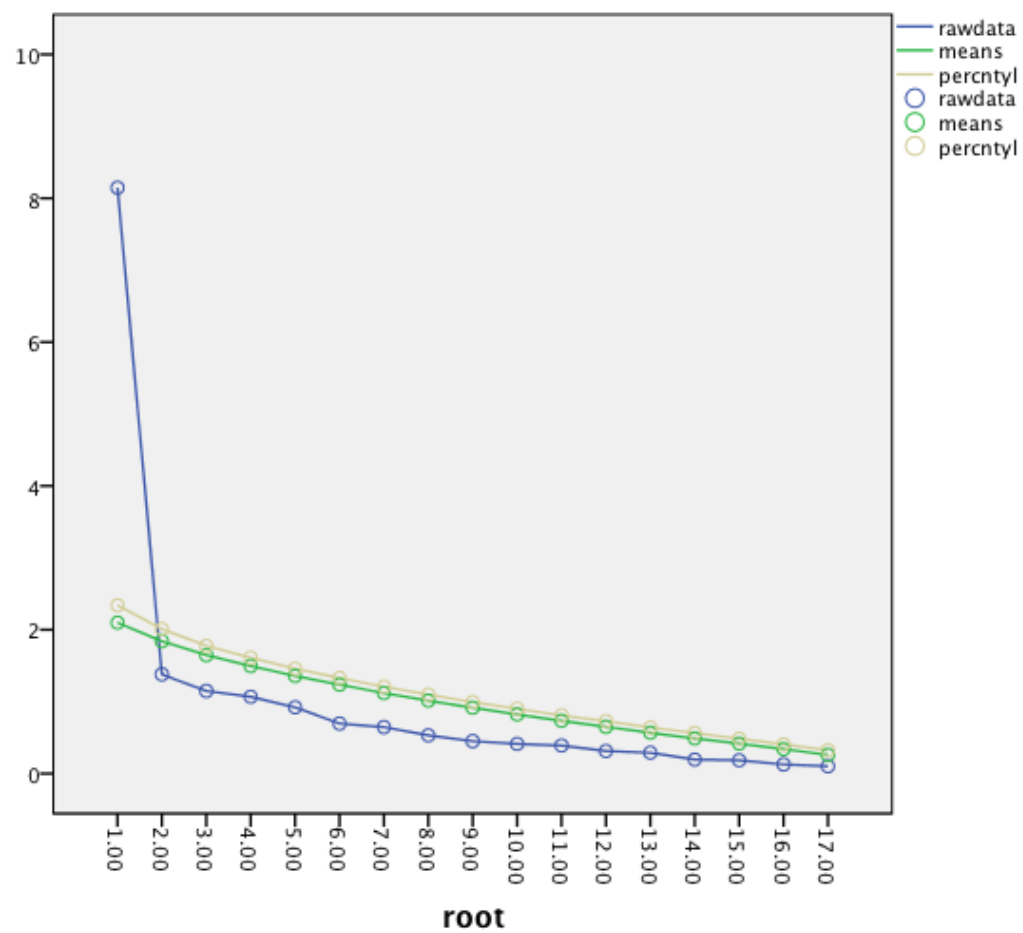
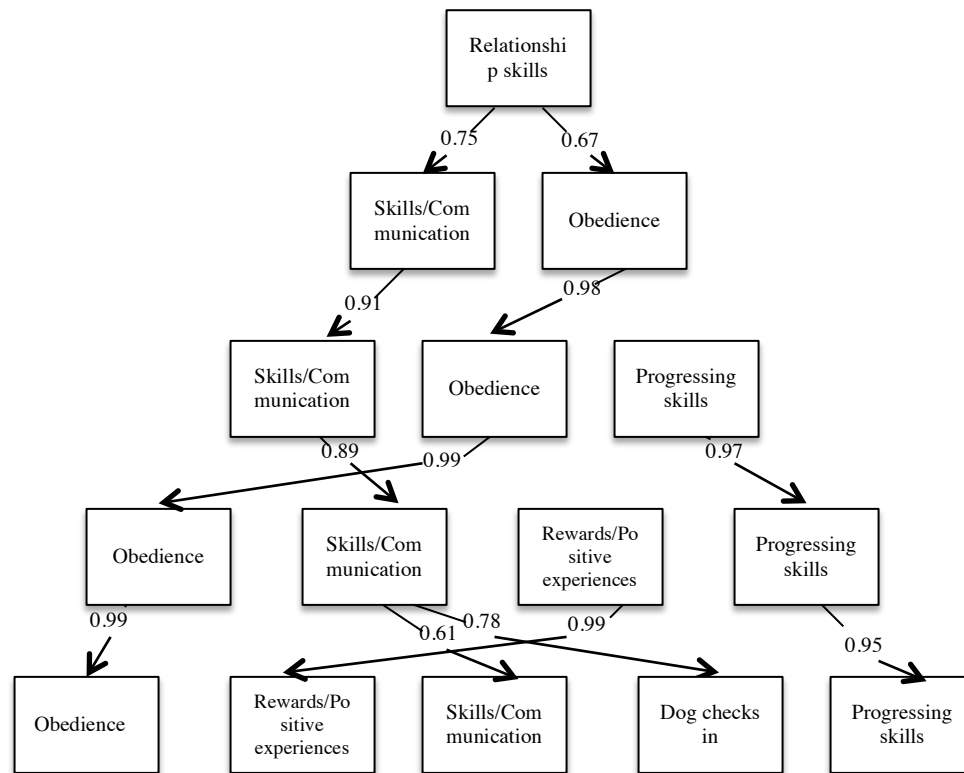


Figure 18. Bass Ackwards of PCA conducted at 13-months based on 17 items. Correlations above 0.50 are indicated.



APPENDICES

Appendix A

Questionnaires used to Assess Dog-Human Relationships

Name or description of questionnaire	Authors	Year created	Brief description
CENSHARE pet attachment survey	Holcombe, Williams, & Richards	1985	Assessing a person's attachment to their pet dog.
Center for the Study of Animal Wellness Pet Bonding Scale (CSAWPBS)	Johnson & Meadows	2003	Responses to receiving dogs in a therapeutic context.
Childhood Pet Ownership Questionnaire	Paul & Serpell	1993	Experience of pets during childhood.
Children's Attitudes and Behaviors towards Animals (CABTA)	Guymmer et al.	2001	A child's attitudes and behaviors towards animals.
Children's Treatment of Animals Questionnaire (CTAQ)	Thompson & Gullone	2003	Assesses children's humane behavior towards animals.
Comfort from Companion Animals Scale (CCAS)	Zasloff, 1996	1996	Assesses the perceived level of emotional comfort people receive from pet dogs and cats.
Companion Animal Bonding Scale (CABS)	Poresky, Hendrix, Mosier, Samuelson	1987	Assessing child-animal activities.
Companion Animal Semantic Differential (CAS)	Poresky et al.	1988	Measuring the respondent's affective perceptions of a significant childhood pet.

Dog Attachment Questionnaire	Archer & Ireland	2011	Aspects of attachment for companion dogs.
Dog Care Responsibility Inventory	Davis	1987	Care and nurturing duties of family pet ownership.
Dog-Companionship survey	Dotson & Hyatt	2008	Various aspects of the dog-companionship experience.
Essential care questionnaire	Shore, Douglas, & Riley	2005	Assessing the level of care in dog owners.
Human animal bond survey	Schneider et al.	2010	Measuring aspects of the owner-companion dog bond.
Lexington Attachment to Pets Scale (LAPS)	Johnson, Garrity, & Stallones	1992	Assessing attachment between pets and people.
Measurement of Pet Intervention (MOPI)	Schiro-Geist	2001	Effect of animal-assisted therapy on client functioning.
Miller-Rada Commitment to Pets Scale	Staats et al.	1996	Assessing people's commitment to their pets.
Monash Owner Relationship Scale	Dwyer, Bennett, & Coleman	2006	Assessing the relationship between dogs and owners.
People's Experiences following the death of a pet	Adams	1996	Assessing how people feel after experiencing the death of a pet.
Pet Attachment	Rubin	1973	Dimensions of loving relationships.
Pet Attachment Questionnaire	Zilcha-Mano, Mikulincer, & Shaver	2011	Assessing the attachment between owners and pet dogs.
Pet Attachment Scale - Revised	Melson	1988	Assessing attachment in children.
Pet Attitude Inventory (PAI)	Wilson, Netting, & New	1987	Pet ownership attitudes and attachment levels.
Pet Attitude Scale – Modified (PAS-M)	Templer et al.	1981	Assessing people's attitudes towards pets.
	Munsell et al.	2004	

Pet Bonding Scale (PBS)	Angle, Blumentritt, & Swank	1993	Assessing the bond between animals and people
Pet Expectations Inventory	George	1992	Assessing the role people expect their pet to take in their life.
Pet Friendship Scale	Davis	1995	Assessing emotional relationship of children and pets
Pet Relationship Scale (PRS)	Kafer, Lago, Wamboldt, & Harrington	1992	Assessing people's attitudes and feelings towards pets.
Quality of life (QoL)	Schneider et al.	2010	Assessing the quality of life of pets.
Questionnaire for Anthropomorphic Attitudes	Topál, Miklósi, & Csányi	1997	Assessing owner's anthropomorphic attitudes towards dogs.
Relational dimensions	Walton & McConocha	1996	Examining the relational dimensions of dog ownership.
Responsibility inventory	Davis	1987	Usual pet care and duties of family pet ownership.

Appendix B

Categories Used to Organize Potential Questionnaire Items

Pet likes	Ownership length
Spending time	Other
Contact seeking	
Play	
Talk	
Obedience	
Training	
Intelligence	
Connection	
Care (general)	
Cleaning/grooming	
Money	
Food	
Exercise	
Medical/veterinary care	
Pet Safety needs	
Socialization	
Family	
Comfort from	
Happiness/joy	
Petting	
Physical closeness/Proximity	
Emotional closeness	
Love	
Companionship	
Attachment (general)	
Protection	
Mental health	
Loss of pet	
Separation	
Pet's awareness	
Showing off pet	
Pet's importance	
General pet attitudes	
Friendship	
Anthropomorphic attitudes	
Dog health	

Ability to read dog
Dog impact on life

Appendix C

Pilot Version of Relationship Questionnaire

Section 1

1. Participant ID number
2. Your age
3. Your gender
4. Your dog's age
5. Your dog's sex
6. Your dog's breed
7. Have you previously raised a dog for Guiding Eyes for the Blind?
8. If so, how many previous dogs have you raised for Guiding Eyes for the Blind?
9. If so, what breed(s) of dogs have you previously raised?
10. If so, what sex(s) of dogs have you previously raised?
11. If so, what was the result of the previous dog(s) you have raised? (working guide dog, in training, breeder, medical release, released from puppy program, released from training, retired guide dog, other)
12. Do you currently own any other dogs?
13. If so, how many other dogs do you own?
14. If so, what breed(s) of dogs do you own?
15. If so, what gender(s) of dogs do you own?
16. If so, how many of these dogs are previous Guiding Eyes for the Blind dogs?

Section 2

Please fill out the following questions in terms of how you feel about your relationship with the dog you are currently raising for Guiding Eyes for the Blind. There are no right or wrong answers in this questionnaire. The aim of the questionnaire is just to provide us with a better idea of what your relationship with your dog is like.

- 1 = Disagree
2 = Slightly disagree
3 = Neither agree nor disagree
4 = Slightly agree
5 = Agree
NA = Not applicable
DN = I do not understand

Content of interactions

1. I do not play with my dog very often.
2. My dog initiates play with me several times a day.
3. My dog usually plays by himself/herself or someone else instead of me, even when I'm around.
4. I play fetch with my dog often.
5. I often incorporate play in to training sessions with my dog.
6. I never play with my dog when I am training him/her.
7. I do not spend a lot of time cleaning and grooming my dog.
8. I walk my dog several times a day.
9. I have the same routine to socialize my dog every week.
10. I socialize my dog several times a week.
11. My dog does not comfort me when I am upset.
12. When my dog is upset, I comfort him/her.
13. I do not pet my dog frequently.
14. My dog does not follow me around the house very often.
15. My dog and I watch TV together frequently.
16. I talk to my dog often.
17. I spend time every day training my dog.
18. I am the person that feeds my dog on a daily basis.
19. I am the person that checks to make sure the dog has water.
20. My dog and I have the same basic routine every day.

Qualities of interactions

21. I feel as if my dog often stays closer to a family member or friend other than me.
22. I enjoy playing with my dog.
23. My dog often is not interested in playing.
24. My dog does not often understand what I tell him/her.
25. My dog obeys me to please me, not just because I give him/her food.
26. I praise my dog when he/she performs well.
27. I yell at my dog when he/she does something bad.
28. I can read my dog's body language.
29. My dog does not seem to be able to read my body language.
30. I am the one most likely to notice when my dog is not feeling well.
31. I enjoy it when my dog sits close to me.
32. I feel emotionally distant from my dog.
33. My dog does not appear to be excited when I come home.
34. My dog often shows love and affection to me.
35. My dog is constantly attentive to me.
36. My dog does not look at me often.
37. I look at my dog often.
38. My dog acts like he/she is a person, not a dog.
39. I treat my dog as a dog, not a person.
40. My dog acts like he/she prefers someone else over me.

Relative frequency and patterning of interactions

41. My dog is left alone for several hours a day.
42. I spend a lot of time with my dog.
43. I spend more time with my other pets or dogs than my GEB dog.
44. I like being near my dog all the time.
45. I wish my dog spent more time with someone else other than me.
46. Someone else is usually the one that takes care of my dog.
47. I interact or have close contact with my dog for a majority of the time I am awake.
48. My dog spends more time with me than he/she does with anyone else.
49. My dog follows me wherever I go.
50. I focus on my dog more when he/she is doing something wrong than when he/she is doing something right.

Reciprocity vs. complementarity /similarity vs. difference

51. My dog's personality is not very similar to my own personality.
52. My dog is very similar to me.
53. My dog does not always respond when I talk to him/her.
54. My dog always pays attention to me and obeys me right away.
55. My dog often does not come when I call his/her name.
56. My dog does not stay on command.
57. My dog is bonded with me.
58. I feel emotionally attached to my dog.
59. I am not very attached to my dog.
60. My dog does not appear to enjoy it when I pet him/her.
61. My dog and I have a very close relationship.
62. My dog does not understand my feelings.
63. My dog pays more attention to strangers than he/she does with me.
64. My dog shows more interest in me than in my family/friends.
65. I feel satisfied with my relationship with my dog.
66. My dog seems to enjoy spending time with me.
67. My dog often shows signs of distress (e.g., whining) when I am away.
68. I do not often call or email the puppy sitter to ask about my dog when I am away.

Intimacy

69. I find it easier to talk to my dog than to people.
70. I often tell my dog things I don't tell anyone else.
71. I receive more companionship from friends or family than from my dog.
72. I feel like my dog is a wonderful companion for me.

Interpersonal perception

73. I feel like I have good dog sense when interacting with my dog.
74. My dog learns very slowly in comparison to other dogs.

- 75. I know my dog's personality.
- 76. I do not understand my dog very well.
- 77. I can tell when my dog is about to misbehave.
- 78. My dog understands me very well.

Commitment

- 79. I have attended most of the training classes for my dog.
- 80. It is a hassle to go to every training class for my dog.
- 81. I am committed to taking care of my dog because it is for a worthwhile cause.
- 82. I have the same responsibilities as a parent when it comes to taking care of my dog.
- 83. I feel like my dog makes too much mess.
- 84. I often buy my dog toys for special occasions.
- 85. I never buy premium food for my dog to eat.
- 86. I think about my dog frequently when we are not together.
- 87. I enjoy the experience of raising a puppy.
- 88. Having to give up my dog is the most difficult part of the puppy raising experience.
- 89. It will not be difficult for me to give up my dog at the end of the puppy raising experience.
- 90. Giving up my dog will be more difficult than any other dog I have raised in the past.
- 91. I do not often talk about my dog to other people.
- 92. I like to show off my dog and talk about my dog's purpose to others.

Other

- 93. I feel as if my dog is currently progressing well for his/her age.
- 94. I see my dog as an extension of myself.
- 95. Taking care of my dog has increased the stress in my life.
- 96. My dog has improved my physical health.
- 97. My dog is clever.
- 98. My dog chews on things that he/she is not supposed to.

Open-ended questions

- 99. Which of the following would you say your relationship with your dog is MOST like (parent/child, husband/wife, mentor/advisee, brother/sister, other)?
- 100. Please describe how you feel about your relationship with your dog. In your response, please include information about what you feel your relationship with your dog is like, how this compares to relationships you have with any other dogs/pets, and how this compares to how any other person's relationship with your dog is. Please also talk about how your relationship has developed over time.
- 101. Why did you decide to raise a guide dog puppy?

Appendix D

Final Version of Relationship Questionnaire

This questionnaire will take approximately 20-30 minutes to complete, so please make sure you have enough time to complete the questionnaire.

1. What is your participant ID number (it should be a 3 digit number from the email you were sent)?
2. What is your dog's name?
3. At the beginning of your dog's last Walk & Talk, you should have been asked to participate in a figure 8 exercise. We are looking for the person who handled the dog during this exercise to fill out this questionnaire. Are you the person who handled the dog during the figure 8 exercises? If not, you will be given the option to leave us the email of the person who did handle the dog during this time.
4. If no, please leave the name and email of someone else who did handle the dog during the walk-and-talk.
5. For about what percentage of your dog's last walk-and-talk did you (as opposed to another family member) handle your dog? Just click on the number to indicate the percentage of time.
6. Do you co-raise your dog with anyone else?
7. If yes, how many other people do you co-raise your dog with?
8. How old are you?
9. What is your gender?
10. How old is your dog (please answer in months)?
11. What sex is your dog?
12. What breed is your dog?
13. Please enter information about the other dogs in your household including Guiding Eyes for the Blind pets or breeders. (breed, sex, neutered, Is this a GEB dog, was the dog released or retired?).
14. Not including your current dog, how many dogs have you raised for Guiding Eyes for the Blind?
15. To gain a complete picture and to help with statistical consistency, please provide the name and email address of up to 3 additional people who would be willing to help us with our study. They should know you and your relationship with your Guiding Eyes puppy. This could be a member of your household or a friend who is familiar with you and your dog. We will send them an email shortly after you complete this questionnaire and they will also receive a questionnaire to fill out. This questionnaire should take up approximately 10-15 minutes to complete.

Please fill out the following questions in terms of how you feel about your relationship with the dog you are currently raising for Guiding Eyes for the Blind. There are no right or wrong answers in this questionnaire. The aim of the questionnaire is just to provide us with a better idea of what your relationship with your dog is like.

1 = Disagree

2 = Slightly disagree

3 = Neither agree nor disagree

4 = Slightly agree

5 = Agree

NA = Not applicable

1. I play with my dog all the time.
2. My dog initiates play with me several times a day.
3. My dog usually plays by himself/herself or someone else instead of me, even when I'm around.
4. I play fetch with my dog often.
5. I often incorporate play in to training sessions with my dog.
6. I never play with my dog when I am training him/her.
7. I do not spend a lot of time cleaning and grooming my dog.
8. I walk my dog several times a day.
9. I have the same routine to socialize my dog every week.
10. I socialize my dog at least several times a week.
11. My dog does not comfort me when I am upset.
12. When my dog is upset, I give him/her time to return to a calm emotional state.
13. I do not pet my dog frequently.
14. My dog does not follow me around the house very often.
15. My dog and I spend quiet time such as watching TV, reading, or doing homework together.
16. I talk to my dog about things like what is going on in my life often.
17. I spend time every day training my dog.
18. I am the person that feeds my dog on a daily basis.
19. I am the person that checks to make sure my dog has water on a daily basis.
20. My dog and I go through the same basic routine every day.
21. I feel as if my dog often stays physically closer to another family member or a friend than me.
22. I enjoy playing with my dog.
23. My dog often is not interested in playing with me.
24. Often, my dog does not understand the commands I give him/her.
25. My dog obeys me to please me, not just because I give him/her food.
26. I praise my dog when he/she performs well.
27. I yell at my dog when he/she does something bad.
28. I can read my dog's body language.

29. My dog does not seem to be able to read my body language.
30. I am the one most likely to notice when my dog is not feeling well.
31. I enjoy it when my dog sits close to me.
32. I do not feel like I have an emotional connection with my dog.
33. My dog acts like he/she is excited to see me every day when I come home.
34. My dog often shows love and affection to me.
35. My dog is constantly attentive to me.
36. My dog does not look at me often.
37. I look at my dog often.
38. My dog acts like a person, not a dog.
39. I treat my dog as a dog, not as a person.
40. My dog acts like he/she prefers someone else over me.
41. My dog is left alone without people for several hours a day.
42. I spend a lot of time with my dog.
43. I spend more time with my other pets or dogs than my GEB dog.
44. I like being near my dog all the time.
45. I wish my dog spent more time with someone else other than me.
46. Someone else other than me is usually the one that takes care of my dog.
47. I interact or have close contact with my dog for a majority of the time I am awake.
48. My dog spends more time with me than he/she does with anyone else.
49. My dog follows me wherever I go.
50. I focus on my dog more when he/she is doing something wrong than when he/she is doing something right.
51. My dog's personality is very similar to my own personality.
52. My dog and I are very similar in the way we act.
53. My dog does not always respond when I give him/her commands.
54. My dog always pays attention to me and obeys me right away.
55. My dog often does not come right away when I call his/her name.
56. My dog does not stay on command.
57. My dog is bonded with me.
58. I feel emotionally attached to my dog.
59. I am not very attached to my dog.
60. My dog usually walks away when I pet him/her.
61. My dog and I have a very close relationship.
62. My dog does not understand my feelings.
63. My dog pays more attention to strangers than he/she does with me.
64. My dog shows more interest in me than in my family/friends.
65. I feel satisfied with my relationship with my dog.
66. My dog seems to enjoy spending time with me.
67. My dog often shows signs of distress (e.g., whining) when I am away.
68. I do not often call or email the puppy sitter to ask about my dog when I am away.
69. I find it easier to talk to my dog than to talk to people.
70. I often tell my dog things I don't tell anyone else.

71. I feel like I have more of a friendship with my dog than with my friends or family.
72. My dog is a wonderful companion for me.
73. I feel like I have good dog sense when interacting with my dog.
74. My dog learns very slowly in comparison to other dogs.
75. I know how my dog will act in any situation.
76. I do not understand my dog very well.
77. I can tell when my dog is about to misbehave.
78. My dog understands me very well.
79. I have attended most of the training classes for my dog.
80. It is unnecessary to go to every training class for my dog.
81. I am committed to taking care of my dog because it is for a worthwhile cause.
82. Taking care of my dog comes with the same responsibilities as taking caring of a child.
83. I feel like my dog makes too much mess.
84. I often buy my dog new toys.
85. I sometimes give my dog table scraps.
86. I think about my dog frequently when we are not together.
87. I enjoy the experience of raising a puppy.
88. Having to give up my dog is the most difficult part of the puppy raising experience.
89. It will not be difficult for me to give up my dog at the end of the puppy raising experience.
90. Giving up my dog will be more difficult than any other dog I have raised in the past (if applicable).
91. I do not often talk about my dog to other people.
92. I often show off my dog and talk about my dog's purpose to others.
93. I feel as if my dog is currently progressing well for his/her age.
94. Taking care of my dog has increased the stress in my life.
95. My dog has improved my physical health.
96. My dog is clever.
97. My dog chews on things that he/she is not supposed to.
98. I always let my dog sleep in the crate in my bedroom instead of some other place in the house.
99. Based on your own current knowledge about your dog, how likely do you think it is that your dog will pass his/her IFT?
100. Based on your own current knowledge about your dog, how likely do you think it is that your dog will graduate as a guide dog?

Open-ended questions

101. Which of the following would you say your relationship with your dog is MOST like (parent/child, husband/wife, mentor/advisee, brother/sister, other)?
102. Are you planning on raising another guide dog puppy?

- 103. Please describe your relationship with your dog. For example, do you enjoy spending time with your dog? Do you feel like your dog is connected to you?
- 104. How does your relationship with your dog compare to relationships you have with any other dogs/pets?
- 105. How does your relationship with your dog compare to how any other person's relationship with your dog is?
- 106. How has your relationship with your dog developed over time?
- 107. Why did you decide to raise a guide dog puppy?

Appendix E

Big Five Personality Inventory

Big Five Inventory

BFI (V44)

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement.

Disagree Strongly 1	Disagree a little 2	Neither agree nor disagree 3	Agree a little 4	Agree strongly 5
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I See MYSELF as Someone Who . . .

_____ 1. Is talkative

_____ 23. Tends to be lazy

_____ 2. Tends to find fault with others

_____ 24. Is emotionally stable, not easily upset

_____ 3. Does a thorough job

_____ 25. Is inventive

_____ 4. Is depressed, blue

_____ 26. Has an assertive personality

_____ 5. Is original, comes up with new ideas

_____ 27. Can be cold and aloof

_____ 6. Is reserved

_____ 28. Perseveres until the task is finished

- | | |
|---|---|
| _____7. Is helpful and unselfish with others | _____29. Can be moody |
| _____8. Can be somewhat careless | _____30. Values artistic, aesthetic experiences |
| _____9. Is relaxed, handles stress well | _____31. Is sometimes shy, inhibited |
| _____10. Is curious about many different things | _____32. Is considerate and kind to almost everyone |
| _____11. Is full of energy | _____33. Does things efficiently |
| _____12. Starts quarrels with others | _____34. Remains calm in tense situations |
| _____13. Is a reliable worker | _____35. Prefers work that is routine |
| _____14. Can be tense | _____36. Is outgoing, sociable |
| _____15. Is ingenious, a deep thinker | _____37. Is sometimes rude to others |
| _____16. Generates a lot of enthusiasm | _____38. Makes plans and follows through with them |
| _____17. Has a forgiving nature | _____39. Gets nervous easily |
| _____18. Tends to be disorganized | _____40. Likes to reflect, play with ideas |
| _____19. Worries a lot | _____41. Has few artistic interests |
| _____20. Has an active imagination | _____42. Likes to cooperate with others |
| _____21. Tends to be quiet | _____43. Is easily distracted |

_____22. Is generally trusting

_____44. Is sophisticated in art, music, or literature

Appendix F

Informant Version of Relationship Questionnaire

This questionnaire will take approximately 15-20 minutes to complete, so please make sure you have enough time to complete the questionnaire.

1. What is your participant ID number (it should be a 3 digit number from the email you were sent)?
2. What is your name?
3. What is the name of your acquaintance's dog that you are filling out this questionnaire for?
4. How long have you known this acquaintance? (please answer in years)
5. How long have you known this acquaintance's dog? (please answer in months)
6. What is your relationship with this acquaintance? (spouse, parent/grandparent, child, other relative, friend from Guiding Eyes, other friend, other)

Please fill out the following questions in terms of how you feel about your acquaintance's relationship with the dog he/she is currently raising for Guiding Eyes for the Blind. There are no right or wrong answers in this questionnaire. The aim of the questionnaire is just to provide us with a better idea of what the dog/puppy raiser relationship is like.

- 1 = Disagree
2 = Slightly disagree
3 = Neither agree nor disagree
4 = Slightly agree
5 = Agree
NA = Not applicable
DN = I do not know

Content of interactions

1. He/she plays with his/her dog all the time.
2. His/her dog initiates play with him/her several times a day.
3. His/her dog usually plays alone or with someone else instead of him/her, even when he/she is around.
4. He/she plays fetch with his/her dog often.
5. He/she often incorporates play in to training sessions with his/her dog.
6. He/she never plays with his/her dog when he/she is training his/her dog.
7. He/she does not spend a lot of time cleaning and grooming his/her dog.
8. He/she walks his/her dog several times a day.

9. He/she has the same routine to socialize his/her dog every week.
10. He/she socializes his/her dog at least several times a week.
11. His/her dog does not comfort him/her when he/she is upset.
12. When his/her dog is upset, he/she gives his/her dog time to return to a calm emotional state.
13. He/she does not pet his/her dog frequently.
14. His/her dog does not follow him/her around the house very often.
15. He/she spends quiet time with his/her dog such as watching TV, reading, or doing homework together.
16. He/she talks to his/her dog about things like what is going on in their life often.
17. He/she spends time every day training his/her dog.
18. He/she is the person that feeds his/her dog on a daily basis.
19. He/she is the person that checks to make sure his/her dog has water on a daily basis.
20. He/she goes through the same basic routine every day with his/her dog.
21. He/she feels as if his/her dog often stays physically closer to another family member or a friend than him/her.
22. He/she enjoys playing with his/her dog.
23. His/her dog often is not interested in playing with him/her.
24. Often, his/her dog does not understand the commands he/she gives his/her dog.
25. His/her dog obeys him/her to please him/her, not just because he/she feeds his/her dog.
26. He/she praises his/her dog when his/her dog performs well.
27. He/she yells at his/her dog when his/her dog does something bad.
28. He/she can read his/her dog's body language.
29. His/her dog does not seem to be able to read his/her body language.
30. He/she is the one most likely to notice when his/her dog is not feeling well.
31. He/she enjoys it when his/her dog sits close to him/her.
32. He/she does not feel like he/she has an emotional connection with his/her dog.
33. His/her dog acts excited to see him/her every day when he/she comes home.
34. His/her dog often shows love and affection to him/her.
35. His/her dog is constantly attentive to him/her.
36. His/her dog does not look at him/her often.
37. He/she looks at his/her dog often.
38. He/she feels as if his/her dog acts like a person, not a dog.
39. He/she treats his/her dog as a dog, not as a person.
40. His/her dog appears to prefer someone else over him/her.
41. His/her dog is left alone without people for several hours a day.
42. He/she spends a lot of time with his/her dog.
43. He/she spends more time with his/her other pets or dogs than his/her GEB dog.
44. He/she likes being near his/her dog all the time.
45. He/she wishes his/her dog spent more time with someone else other than him/her.
46. Someone else other than him/her is usually the one that takes care of his/her dog.

47. He/she interacts or has close contact with his/her dog for a majority of the time he/she is awake.
48. His/her dog spends more time with him/her than his/her dog does with anyone else.
49. His/her dog follows him/her wherever he/she goes.
50. He/she focuses on his/her dog more when his/her dog is doing something wrong than when his/her dog is doing something right.
51. His/her dog's personality is not very similar to his/her own personality.
52. His/her dog acts very similar to the way he/she acts.
53. His/her dog does not always respond when he/she gives his/her dog commands.
54. His/her dog always pays attention to him/her and obeys him/her right away.
55. His/her dog often does not come right away when he/she calls his/her dog's name.
56. His/her dog does not stay on command.
57. His/her dog is bonded with him/her.
58. He/she feels emotionally attached to his/her dog.
59. He/she is not very attached to his/her dog.
60. His/her dog usually walks away when he/she pets his/her dog.
61. He/she has a very close relationship with his/her dog.
62. His/her dog does not understand his/her feelings.
63. His/her dog pays more attention to strangers than his/her dog does with him/her.
64. His/her dog shows more interest in him/her than in his/her family or friends.
65. He/she feels satisfied with his/her relationship with his dog.
66. His/her dog seems to enjoy spending time with him/her.
67. His/her dog often shows signs of distress (e.g., whining) when he/she is away.
68. He/she does not often call or email the puppy sitter to ask about his/her dog when he/she is away.
69. He/she finds it easier to talk to his/her dog than to talk to people.
70. He/she often tells his/her dog things he/she doesn't tell anyone else.
71. He/she feels like he/she has more of a friendship with his/her dog than with his/her friends or family.
72. He/she feels like his/her dog is a wonderful companion for him/her.
73. He/she feels like he/she has good dog sense when interacting with his/her dog.
74. His/her dog learns very slowly in comparison to other dogs.
75. He/she knows how his/her dog will act in any situation.
76. He/she does not understand his/her dog very well.
77. He/she can tell when his/her dog is about to misbehave.
78. His/her dog understands him/her very well.
79. He/she has attended most of the training classes for his/her dog.
80. He/she feels it is unnecessary to go to every training class for his/her dog.
81. He/she is committed to taking care of his/her dog because it is for a worthwhile cause.
82. He/she feels taking care of his/her dog comes with the same responsibilities as taking caring of a child.

83. He/she feels like his/her dog makes too much mess.
84. He/she often buys his/her dog new toys.
85. He/she sometimes gives his/her dog table scraps.
86. He/she thinks about his/her dog frequently when they are not together.
87. He/she enjoys the experience of raising a puppy.
88. Having to give up his/her dog will be the most difficult part of the puppy raising experience for him/her.
89. It will not be difficult for him/her to give up his/her dog at the end of the puppy raising experience.
90. Giving up his/her dog will be more difficult than any other dog he/she have raised in the past (if applicable).
91. He/she does not often talk about his/her dog to other people.
92. He/she often shows off his/her dog and talk about his/her dog's purpose to others.
93. He/she feels as if their dog is currently progressing well for his/her dogs' age.
94. Taking care of his/her dog has increased the stress in his/her life.
95. His/her dog has improved his/her physical health.
96. His/her dog is clever.
97. His/her dog chews on things that his/her dog is not supposed to.
98. He/she always lets his/her dog sleep in the crate in his/her bedroom instead of some other place in the house.
99. Based on your own current knowledge about your acquaintance's dog, how likely do you think it is that his/her dog will pass his/her dog's IFT?
100. Based on your own current knowledge about your acquaintance's dog, how likely do you think it is that his/her dog will graduate as a guide dog?

Appendix G

Walk-and-talk Items

Pup in the green zone – The emotional state of mind that the pup is in when he is ready to learn new things. A pup in the green zone shows evidence of smooth movements, being balanced, relaxed, calm, and engaged.

1. Never – The pup does not appear to be in the green zone or takes over 5 minutes to return to the green zone after the cause of arousal has passed.
2. Rarely – The pup appears to be in the green zone very infrequently or takes between 3 and 5 minutes to return to the green zone after the cause of arousal has passed.
3. Occasionally – The pup appears to be in the green zone about half of the time or takes between 1-3 minutes to return to the green zone after the cause of arousal has passed.
4. Frequently – The pup appears to be in the green zone most of the time.
The pup may become aroused a few times, but returns to the green zone again between 15 seconds to 1 minute after the cause of arousal has passed.
5. Always – The pup always appears to be in the green zone or returns to the green zone again within 15 seconds after the cause of arousal has passed.

Raiser allows pup time to resolve conflict – The raiser allows the pup time to process and relax in new situations. A raiser allowing her pup to relax in new situations is one that allows the pup to explore a defined area on a loose leash, and rewards Check-ins when offered.

1. Never – The raiser almost never effectively allows the pup time to resolve conflict in situations that arouse the pup.
2. Rarely – The raiser very infrequently effectively allows the pup time to resolve conflict in situations that arouse the pup.
3. Occasionally – The raiser effectively allows the pup time to resolve conflict in about half of the situations that arouse the pup.
4. Frequently – The raiser very frequently effectively allows the pup time to resolve conflict for most, but not all situations that arouse the pup.
5. Always – The raiser almost always effectively allows the pup time to resolve conflict throughout all situations that arouse the pup.

Pup checks in – A pup that offers Check-ins is taking responsibility for his part in keeping the connection. This involves the pup choosing to turn his attention to the handler in a variety of situations without prompting by the handler.

1. Never – The pup almost never checks in with the raiser despite the level of distraction.
2. Rarely – The pup very infrequently checks in with the raiser despite the level of distraction.
3. Occasionally – The pup checks in conditionally with the raiser based on the level of distraction.
4. Frequently – The pup often checks in with the raiser despite level of distraction.
5. Always – The pup checks in with the raiser nearly every time despite level of distraction.

Pup responds to Name Response – Part of the relationship between the pup and raiser. A pup shows a response to his name by turning his attention toward the handler without bribing or leash management.

1. Never - The pup almost never responds when the raiser calls his name despite the level of distraction.
2. Rarely – The pup responds very infrequently when the raiser calls his name despite the level of distraction.
3. Occasionally – The pup responds conditionally when the raiser calls his name based on the level of distraction.
4. Frequently – The pup usually responds when the raiser calls his name despite the level of distraction.
5. Always – The pup reliably responds when the raiser calls his name despite the level of distraction.

Follow Me - pup is taking 50% responsibility for the connection– In any appropriate situation or distraction level, the pup takes responsibility for 50% of the connection during Follow Me, which involves the pup choosing to turn, change speed of movement, and generally follow the handler. The handler takes 50% of responsibility to engage with the pup with average levels of Use of You and changes in speed and direction. The handler does not have to do most of the work for successful Follow Me.

1. Never - The raiser has to take 90% or more of the responsibility for the pup to follow in most situations with mild distractions.
2. Rarely - The raiser has to take between 75% and 89% of the responsibility for the pup to follow in most situations with mild distractions.
3. Occasionally - The quality of Follow Me is conditional with mild distractions. In those situations, the raiser has to take 75% or more of the responsibility for the pup to follow in most situations with mild distractions.
4. Frequently - The pup takes 50% responsibility very frequently. The raiser only needs to take most of the responsibility for brief periods with moderate distractions.
5. Always – The pup takes 50% responsibility for the connection almost all of the time despite mild to moderate distractions.

Raiser's Use of You meets the pup's needs – The raiser effectively uses smiles, touch, heartfelt verbal praise, eye contact and/or body language to engage with the pup, to pay attention, to provide calming touch, and to provide praise. These signs may differ based on the situation and the pup's needs.

1. Never – The raiser almost never provides effective Use of You to meet the pup's needs.
2. Rarely – The raiser very infrequently provides effective Use of You to meet the pup's needs.
3. Occasionally – The raiser provides effective Use of You to meet the pup's needs about half of the time.
4. Frequently – The raiser very frequently provides effective Use of You to meet the pup's needs.
5. Always – The raiser almost always provides effective Use of You to meet the pup's needs.

Raiser provides clear communication – The raiser communicates clearly to the pup so that the pup understands the raiser's requests and expectations. Clear communication includes consistent, clear verbal and hand cues, clear body language, using skills to direct, knowing the criteria, practicing the Rule of Three, using the marker word "yes", using the release word, and using Use of You.

1. Never – The raiser almost never uses the aspects of clear communication as needed.
2. Rarely – The raiser infrequently uses the aspects of clear communication as needed.
3. Occasionally – The raiser uses the aspects of clear communication as needed about half of the time.
4. Frequently – The raiser frequently uses the aspects of clear communication as needed.
5. Always – The raiser almost always uses the aspects of clear communication as needed.

Raiser gives food rewards properly – The raiser's ability to give food rewards in a proper way, which includes never allowing the pup to eat a food reward that has been dropped on the floor or ground, giving food rewards only when the pup takes them politely, and always giving food rewards with the Use of You.

1. Never - The raiser almost never gives food rewards properly.
2. Rarely - The raiser very infrequently gives food rewards properly.
3. Occasionally - The raiser gives food rewards properly about half of the time.
4. Frequently - The raiser gives food rewards properly most, but not all, of the time.
5. Always – The raiser always gives food rewards properly.

Pup takes rewards politely – The pup takes rewards politely from the raiser as evidenced by not coming forward to get the reward and not biting the raiser's hand.

1. Never – The pup almost never takes rewards politely from the raiser.
2. Rarely – The pup very infrequently takes rewards politely from the raiser.
3. Occasionally – The pup takes rewards politely from the raiser about half of the time.
4. Frequently – The pup take food rewards from the raiser most, but not all of the time.
5. Always – The pup always takes rewards politely from the raiser.

Pup is able to walk without pulling – A pup that walks with a loose leash does not pull even when excited or in the presence of distractions.

1. Never – The pup almost never walks without pulling with mild distraction appropriate for the pup’s development stage.
2. Rarely – The pup very infrequently walks without pulling with mild distraction appropriate for the pup’s development stage.
3. Occasionally – The pup walks without pulling about 50% of the time with mild distractions appropriate for the pup’s development stage.
4. Frequently – The pup very frequently walks without pulling with mild distractions appropriate for the pup’s development stage most, but not all, of the time.
5. Always – The pup almost always walks without pulling with mild distractions appropriate for the pup’s development stage.

Raiser keeps a loose leash – The raiser keeps the leash loose and is not the cause of the leash being tight except with appropriate use of the technique of limiting the leash.

1. Never – The raiser is never the cause of the leash being tight except with appropriate use of the technique of limiting the leash.
2. Rarely – The raiser very infrequently keeps the leash loose except with appropriate use of the technique of limiting the leash.
3. Occasionally – The raiser keeps the leash loose about half of the time except with appropriate use of the technique of limiting the leash.
4. Frequently – The raiser very frequently keeps the leash loose for most, but not all, of the time except with appropriate use of the technique of limiting the leash.
5. Always – The raiser almost always keeps the leash loose except with appropriate use of the technique of limiting the leash.

Repeated positive experiences – The raiser provides the pup repeated positive experiences in a variety of situations appropriate for the pup’s confidence and emotional state. A positive experience includes giving the pup time to settle and process, time to play and rest, increasing exposure only when the pup is comfortable, avoiding pressuring the pup, and adjusting the 3Ds as needed.

1. Strongly disagree – The pup lacks getting the frequency, variety, and/or quality of repeated positive experiences to meet the pup’s needs, which has a strong impact on the pup’s confidence.

2. Disagree – The pup lacks getting the frequency, variety, and/or quality of repeated positive experiences to meet the pup's needs, which has a moderate impact on the pup's confidence.
3. Neither agree nor disagree– The pup's confidence is continually improving in most areas however the pup is in need of receiving increased frequency, variety, and/or quality of repeated positive experiences to meet the pup's needs.
4. Agree– The pup's confidence is continually improving in all areas however the pup is in need of receiving increased frequency, variety, and/or quality of repeated positive experiences to meet the pup's needs.
5. Strongly agree – The pup's confidence is continually improving in all areas and is receiving the frequency, variety, and/or quality of repeated positive experiences to meet the pup's needs.

Pup settles – The pup is able to relax and settle on his own when the raiser is idle. The pup should be able to settle in a variety of situations. A pup that is fully settled is relaxed and calm.

1. Never – The pup almost never settles on his own when the raiser is idle.
2. Rarely – The pup very infrequently settles on his own when the raiser is idle.
3. Occasionally – The pup is able to settle on his own in about half of the situations when the raiser is idle.
4. Frequently – The pup is able to settle on his own most of the time when the raiser is idle.
5. Always – The pup is able to settle on his own every time the raiser is idle.

Pup left alone uncaged– The pup is relaxed when left alone uncaged in a room or in the house. A relaxed pup is calm, settled, and is not stressed when left alone.

1. Never – The raiser is not able to consistently leave the pup alone uncaged for 5 minutes with the pup remaining calm and settled.
2. Rarely – The raiser is not able to consistently leave the pup alone uncaged for 10 minutes with the pup remaining calm and settled.
3. Occasionally – The raiser can consistently leave the pup alone uncaged for 10 minutes with the pup remaining calm and settled.
4. Frequently – The raiser can consistently leave the pup alone uncaged for 15 minutes with the pup remaining calm and settled
5. Always – The raiser can consistently leave the pup alone uncaged for 20 minutes with the pup remaining calm and settled.

Raiser uses skills to direct – The raiser uses skills the pup knows to direct him throughout the day. A raiser uses skills the pup knows such as Name Response, Sit, Down, Stand, Heel, Stay, Come, Out, Place, and/or Kennel to communicate what she wants the pup to do instead of managing the pup with the leash or by luring with food.

1. Never – The raiser almost never uses skills to direct the pup.
2. Rarely – The raiser very infrequently uses skills to direct the pup.
3. Occasionally– The raiser uses skills to direct the pup about half of the time.
4. Frequently–The raiser often uses skills to direct the pup.
5. Always–The raiser almost always uses skills to direct the pup the entire time.

Raiser progressing pup's skills – The raiser should demonstrate an ability to progress his/her pup's skills. A raiser that is effectively progressing his/her pup's skills is characterized by adjusting the 3 D's as needed, building duration first, increasing the level of distraction after the pup has good duration, orchestrating situations for the pup's, increasing dependency on food rewards by increasing the Use of You, having clear criteria for what is the correct performance for the skill at the step the pup is at, incorporating Puppy Politeness Poker, and practicing frequently in familiar and unfamiliar situations.

1. Strongly disagree – The raiser does not show any evidence for progressing his/her pup's skills.
2. Disagree – The raiser shows minimal evidence for progressing his/her pup's skills.
3. Neither agree nor disagree – The raiser shows some evidence for progressing his/her pup's skills.
4. Agree – The raiser shows a good amount of evidence for progressing his/her pup's skills.
5. Strongly agree – The raiser shows strong evidence for progressing his/her pup's skills.

Pup skills – The pup's skills are at an appropriate step for his age. Pups at 4 months old should be reliable with frequent support and/or the raiser adjusting distance and distractions at Step 2 with duration for core skills (Sit, Down, Come, Name Response). Pups at 8 months should be reliable up to moderate distraction with frequent support, and low distraction with minimal support at Step 3. Pups at 13 months should have very reliable responses in almost all situations at Step 4.

1. Strongly disagree - The pup does not show any evidence for being at an appropriate skill level for his age.
2. Disagree – The pup shows minimal evidence for being at an appropriate skill level for his age.
3. Neither agree nor disagree – The pup shows some evidence for being at an appropriate skill level for his age.
4. Agree – The pup shows a good amount of evidence for being at an appropriate skill level for his age.
5. Strongly agree – The pup shows strong evidence for being at an appropriate skill level for his age.

Appendix H

Figure-8 Codings and Ratings

Name of item	Type (rating/coding)	Explanation
Total time to complete task	Coding - duration	The total amount of time it takes from when the dog and raiser start the task to when the dog and raiser finish the task. Time starts as soon as the instructor finishes going over the directions for the task and tells the dog and raiser to begin or as soon as the video begins if no instructions are given. Time ends when the dog is in the down position after completing the figure 8 exercise.
Sit time	Coding - duration	The total amount of time it takes for the dog to sit from the raiser's commands. Sitting duration begins as soon as the raiser is in the middle of the cones and commands the dog to sit down. Sitting duration ends as soon as the dog is fully seated.
Down time	Coding - duration	The total amount of time it takes for the raiser to get the dog to lie down. Down duration begins as soon as the raiser is in the middle of the cones and asks the dog to lie down. Down duration ends as soon as the dog fully in a down position.
Distraction	Coding - frequency	The total number of times the dog is distracted during the task. A dog is distracted when he/she is not focused on the task or the raiser. Signs of distraction include if the dog is sniffing the ground, if the dog is pulling on the leash, if the dog pulls toward another person or dog, etc. A new distraction frequency occurs after at least a 2 second pause in the dog being distracted by something.
Leash tension	Coding - frequency	The total number of times the dog or raiser is pulling on the leash. This includes any time there is tension on the leash, whether it is the dog or the raiser or both pulling on the leash. A new leash tension frequency occurs after at least a 2 second pause in the raiser or dog having any tension on the leash.

Treats	Coding - frequency	The total number of times the raiser gives the dog a treat. One frequency includes each time the raiser gives a dog a treat.
Verbal praise	Coding - frequency	The total number of times the raiser praises the dog. Praise can include any time the raiser says or does anything to indicate the dog has done something they wanted the dog to do. Examples of praise include saying 'good', 'yes', 'very nice'. A new verbal praise frequency occurs after at least a 2 second pause in the raiser verbally praising the dog to do something.
Commands	Coding - frequency	The total number of times the raiser gives the dog a command. This includes only verbal commands, such as "let's go", "this way", or anything else the raiser says in order to instruct the dog. A new command frequency occurs after at least a 2 second pause in the raiser verbally commanding the dog to do something.
Dog focus	Rating	The focus of the dog in completing the task asked of him/her. A dog that is highly focused is on task for the entire time. A dog that is highly focused completes the task without getting distracted. Signs of bad focus include not making eye contact and sniffing the ground.
Raiser focus	Rating	The focus of the raiser in completing the task asked of him/her. A raiser that is highly focused is on task for the entire time. Signs of bad focus include talking to the camera person or evaluator and staring at a person walking by.
Raiser's level of communication	Rating	How often the raiser communicates with the dog throughout the task, including both verbal communication. Level of communication refers to how often the raiser is communicating to the dog and not necessarily the quality of the raiser's communication to the dog.
Raiser's quality of communication	Rating	How well the raiser communicates with the dog throughout the task, including both verbal and hand communication. A raiser that has high quality of communication has a dog that knows exactly what to do during the task. Signs of

Dog energy level	Rating	<p>poor communication include inconsistent and unclear instructions and having a dog that does not understand what to do.</p> <p>The dog's energy level throughout the task. A dog with high energy walks around and completes the task in a very quick pace. A dog with low energy slowly walks around and may even need to be pulled in order to finish the task.</p>
Raiser energy level	Rating	<p>The raiser's energy level throughout the task. A raiser with high energy walks around and completes the task in a very quick pace. A raiser with low energy slowly walks around the cones and completes the task in a slow pace.</p>
Raiser-dog coordination	Rating	<p>How coordinated with one another the dog and raiser appear to be. A raiser-dog with good coordination walk in a similar pace with one another and work together to complete the task smoothly. Signs of bad raiser-dog coordination include tangling of the leash and walking in opposite directions.</p>
Relationship quality	Rating	<p>The overall relationship quality between the dog and the raiser. The relationship quality is a combination of characteristics examining how well the dog and raiser work with one another to complete the task. Relationship quality includes how connected both the dog and the raiser are together, how well the raiser and the dog communicate to one another, and how well the two work with one another to complete the task.</p>

Appendix I

Canine Behavioral Assessment & Research Questionnaire (C-BARQ) Dimensions

Dimension	Description
Stranger-directed aggression	A tendency to respond aggressively to strangers approaching or invading a dog's or owner's personal space, territory, or home range.
Owner-directed aggression	A tendency to respond aggressively to the owner or other members of household when challenged, manhandled, stared at, or stepped over or when approached while in possession of food or objects.
Dog-directed aggression	A tendency to respond fearfully or aggressively when approached directly by unfamiliar dogs.
Familiar dog aggression	A tendency to respond fearfully or aggressively when approached directly by familiar dogs.
Trainability	A willingness to attend to the owner, obey simple commands, retrieve objects, respond positively to correction, and ignore distracting stimuli.
Chasing	A tendency to engage in predatory pursuit of cats, birds, and other small animals.
Stranger-directed fear	A tendency to respond fearfully when approached directly by strangers.
Nonsocial fear	A tendency to react fearfully to sudden or loud noises and to unfamiliar objects and situations.
Separation related problems	A tendency to vocalize or engage in destructive behavior when separated from the owner and accompanied or preceded by behavioral and autonomic signs of anxiety including restlessness, loss of appetite, trembling, and excessive salivation.
Pain sensitivity	A tendency to react fearfully to potentially painful procedures, including bathing, grooming, claw-clipping, and veterinary examinations.
Excitability	A tendency to react strongly to potentially exciting or arousing events, such as going for walks or car trips, doorbells, arrival of visitors, and the owner arriving home.
Attachment	A tendency to maintain close proximity to the owner.

Appendix J

Items from Behavioral Checklist (BCL)

Factor	Item	Description
Calmness/Composure	Excitability	Easily activated response to stimuli; may whine in response to stimulus.
Calmness/Composure	High energy	Requires more exercise than average to achieve a calm demeanor.
Calmness/Composure	Drops responsive active	Increase in motor activity and decrease in responsiveness as an active response and/or outlet to stress as evidenced by active sniffing, pulling hard, less focus, higher distraction, fast jerky movements and/or taking food treats harder.
Calmness/Composure	Willingness to settle	Unsettled and/or pursues own interests when is idle (check box for demand barking at handler).
Calmness/Composure	Movement excites	Easily distracted by non-animal movement leaves blowing, flashlight, hose water spraying, etc. and how difficult to redirect interest away from it.
Calmness/Composure	Ability to focus on work	Looking around; attention moves from one stimulus to another without maintaining focus on task; has trouble staying on task.
Calmness/Composure	Dog distraction	Persistent interest in and high excitability level with other dog(s).
Calmness/Composure	Self modulation	Slow to return to baseline emotional state after stimulus for stress is over.
Calmness/Composure	Barks Excessively	Barks persistently when alarmed or excited.
Focus	Unwilling	Dog pursues own interests, lacks desire to respond to handler. Not to be confused with slow learning or the dog not understanding what it being asked of it.
Focus	Handler dog team	How well dog and handler work together.
Focus	Drops responsive passive	Decrease in motor activity and responsiveness as a passive response

		and /or outlet to stress as evidenced by withdrawing, +/-or quitting or shutting down.
Focus	Olfactory	Very odor driven; persistently sniffs.
Environmental soundness	Local traffic and noise	Rushing, tense body language, tail low or tucked, startle, retreat, escape.
Environmental soundness	Fear of new places and situations	Initially anxious or unsettled in new environments due to stress exhibited as increased or inhibited activity, cautious and/or less responsive or focused. Not to be confused with excitability.
Environmental soundness	Fear of dogs	Low body posture, pulling back, head low, apprehensive, avoidant, hackles, withdraws, reluctant to proceed, watches.
Environmental soundness	Fear of objects	Fearful, avoidant or suspicious of unfamiliar objects.
Environmental soundness	Underfootings	Fearful, nervous, apprehensive of various walking surfaces: (check for slippery floors, gratings, other).
Environmental soundness	Inappropriate elimination	
Body sensitivity	Body handling	Avoidant, fearful and/or aggressive when groomed, towed, having nails clipped or examined by vet or restrained (Check for Nails, Restraint).
Body sensitivity	Harness sensitivity	Drops rear quarters when harness handle lays on back: v mild <10% drop, mild 25%, severe 75% or more drop.
Body sensitivity	Yields space	Moves head or face away when reached for by familiar persons.
N/A	Consistency	How consistent is the dog's confidence, demeanor, and ability to cope in various environments.
N/A	Comparison rating	How well suited is this dog for guide dog work based on our current dogs.

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